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Taxonomic Paper

Megafauna of the UKSRL exploration contract area and eastern Clarion-Clipperton Zone in the Pacific Ocean: Echinodermata

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Abstract

Background

There is growing interest in mining polymetallic nodules from the abyssal Clarion-Clipperton Zone (CCZ) in the tropical Pacific Ocean. Despite being the focus of environmental studies for decades, the benthic megafauna of the CCZ remain poorly known. In order to predict and manage the environmental impacts of mining in the CCZ, baseline knowledge of the megafauna is essential. The ABYSSLINE Project has conducted benthic biological baseline surveys in the UK Seabed Resources Ltd polymetallic-nodule exploration contract area (UK-1). Prior to these research cruises in 2013 and 2015, no biological studies had been done in this area of the eastern CCZ.

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New information

Using a Remotely Operated Vehicle and Autonomous Underwater Vehicle, the megafauna within the UKSRL exploration contract area (UK-1) and at a site ~250 km east of the UK-1 area were surveyed, allowing us to make the first estimates of megafaunal morphospecies richness from the imagery collected. Here, we present an atlas of the abyssal echinoderm megafauna observed and collected during the ABYSSLINE cruises to the UK-1 polymetallic-nodule exploration contract area in the CCZ. There appear to be at least 62 distinct morphospecies (13 Asteroidea, 5 Crinoidea, 9 *Echinoidea*, 29 Holothuroidea and 6 *Ophiuroidea*) identified mostly by imagery but also using molecular barcoding for a limited number of animals that were collected. This atlas will aid the synthesis of megafaunal presence/absence data collected by contractors, scientists and other stakeholders undertaking work in the CCZ, ultimately helping to decipher the biogeography of the megafauna in this threatened habitat.

Keywords

deep-sea mining, polymetallic nodule, Clarion-Clipperton Zone, megafauna, echinoderm, atlas

Introduction

The Clarion-Clipperton Zone (CCZ) is an abyssal region of the tropical eastern Pacific Ocean where deep-sea mining may take place in the near future (Ramirez-Llodra et al. 2011, Wedding et al. 2013; Fig. 1). High-grade polymetallic nodules, which could provide a commercial source of copper, cobalt, nickel, and manganese (among other metals), are abundant in this six million km^2 region that lies in Areas Beyond National Jurisdiction (ABNJ), and thus falls under the legal mandate of the International Seabed Authority (ISA) (Wedding et al. 2013). Thus far, there have been 16 exploration leases (each up to 75,000 km^2 in area) granted by the International Seabed Authority in the CCZ, with those for exploitation expected to soon follow (https://www.isa.org.jm/).

The ABYSSLINE (ABYSSal BaseLINE) Project was designed to undertake benthic biological baseline studies in accordance with ISA environmental guidelines within the UK Seabed Resources Ltd (UKSRL) exploration contract area (UK-1) (Amon et al. 2016b). The UK-1 exploration contract area is one of the easternmost contract areas in the CCZ and encompasses ~58,000 km^2 of seafloor (Fig. 1). The ABYSSLINE Project was led by scientists from the University of Hawai'i at Mānoa (USA), and included scientists from Hawai'i Pacific University (USA), the Natural History Museum, London (UK), the National Oceanography Centre, Southampton (UK), Senckenberg Gesellschaft für Naturforschung (Germany), Uni Research (Norway), and the International Research Institute of Stavanger (Norway). The ABYSSLINE Project aimed to evaluate baseline conditions of community

structure and biodiversity for megafauna, macrofauna, meiofauna and microbes within the UK-1 contract area and across the CCZ (Amon et al. 2016a, Amon et al. 2016b, Dahlgren et al. 2016, Glover et al. 2015, Glover et al. 2016, Shulse et al. 2016). No faunal studies had been undertaken in the UK-1 contract area prior to licensing in 2013.

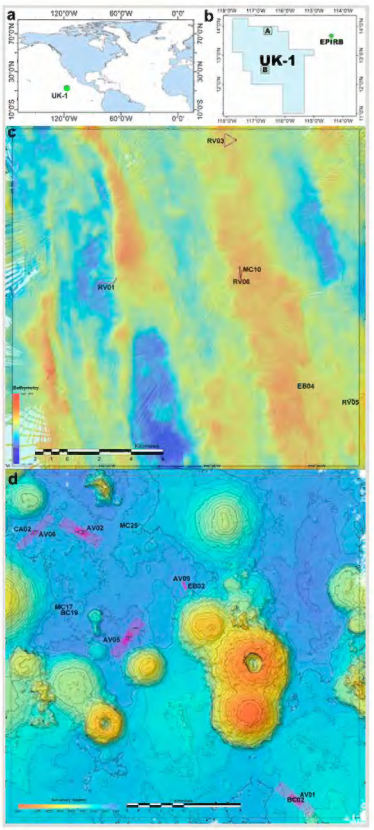

Figure 1.

Locations of megafaunal surveys during the ABYSSLINE cruises, AB01 and AB02, in the Clarion-Clipperton Zone. (a) The location of the UKSRL exploration contract area (UK-1) in the eastern Pacific Ocean. (b) The locations of the 30x30-km survey areas, UK-1 Stratum A and UK-1 Stratum B, in relation to the UK-1 exploration contract area and the AB01 ROV dive site, EPIRB, which was approximately 250 km east of the UK-1 contract area. (c) The locations of ROV dives within UK-1 Stratum A, indicated by purple tracklines labelled with the dive number (e.g. RV01). Stations where samples were collected with a Brenke epibenthic sled (EB04) and megacorer (MC10) are also indicated. (d) The locations of AUV dives within UK-1 Stratum B, indicated by purple tracklines labelled with the dive number (e.g. AV01). Stations where samples were collected with a Brenke epibenthic sled (EB02), box corer (BC02, BC19) and megacorer (MC17, MC25) are also indicated, as well as where imagery was collected with a baited camera (CA02). All maps were created by Seafloor Investigations Ltd for the ABYSSLINE Project using ArcGIS software (https://www.arcgis.com/features/).

It is expected that nodule mining will drastically alter this unique deep-sea habitat with recovery expected to be slow (Amon et al. 2016b, Vanreusel et al. 2016, Ramirez-Llodra et al. 2011, Oebius et al. 2001) and yet, despite increases in technology and the number of expeditions to the area, very little is known about the ecology and biogeography of the fauna inhabiting the region (Amon et al. 2016a, Amon et al. 2016b, Dahlgren et al. 2016, Foell and Pawson 1986, Bluhm and Gebruk 1999, Glover et al. 2016, Martinez-Arbizu et al. 2013, Pawson 1983, Pawson and Foell 1986, Roux 2004, Roux and Pawson 1999, Shulse et al. 2016, Tilot 2006, Vanreusel et al. 2016). The megafauna constitute an important component of the biodiversity in the abyssal deep sea and play a significant role in deep-

sea ecosystem function (Amon et al. 2016a, Amon et al. 2016b, Smith et al. 2008, Vanreusel et al. 2016). It has also been suggested that echinoderms may act as indicators of physical disturbance of the seabed, such as that caused by deep-sea polymetallic-nodule mining (Bluhm and Gebruk 1999). Glover et al. 2016 reported that a search of OBIS listed 698 echinoderm species recorded at abyssal depths worldwide between 3000m and 6000m, but only 50 species within the CCZ. Amon et al. 2016b was able to confirm that there were no echinoderm or megafauna records for the UK-1 exploration contract area in OBIS. This is likely the result of lack of sampling, taxonomy and/or ensuring data are publicly available, especially as an abundant and diverse echinoderm fauna is already known from the tropical Pacific Ocean from photographic and video survey (Amon et al. 2016a, Amon et al. 2016b, Dahlgren et al. 2016, Foell and Pawson 1986, Glover et al. 2016, Martinez-Arbizu et al. 2013, Pawson 1983, Pawson and Foell 1986, Roux and Pawson 1999, Tilot 2006, Vanreusel et al. 2016). In order to predict and manage the environmental impacts of mining in the CCZ and within the UK-1 exploration contract area, baseline knowledge of the megafauna is essential and allows for a complete taxonomic and biogeographic synthesis of the fauna of the CCZ (Wedding et al. 2015).

Here, we present the first section (Echinodermata) of an image atlas of benthic megafauna that inhabit the UK-1 exploration contract area based on ROV and AUV surveys and samples collected during two cruises of the ABYSSLINE project. This section will be supported by the following sections in the near future: 1) Cnidaria, 2) Porifera, and 3) All Other Phyla (Annelida, Arthropoda, Bryozoa, Chordata, Ctenophora, and Mollusca). This atlas was crucial during the ABYSSLINE quantitative megafaunal analyses (Amon et al. 2016b) and we hope that it will facilitate the standardization of the putative morphospecies and be useful to other scientists and stakeholders undertaking research in the CCZ in the future.

Materials and methods

The UKSRL exploration contract area (UK-1) is located in the eastern CCZ in the Pacific Ocean (Fig. 1). There have been two ABYSSLINE research cruises to the UK-1 exploration contract area: the AB01 or MV1313 cruise on the R/V *Melville* from 3 to 27 October 2013, and the AB02 or TN319 cruise on the R/V *Thompson* from 12 February to 25 March 2015. The AB01 cruise focused on a 30x30-km stratum (UK-1 Stratum A) centered at 13°49′ N, 116°36′ W in the northern portion of the UK-1 contract area (Fig. 1). During the AB01 cruise, multibeam bathymetric surveys indicated an abyssal seafloor characterized by ridges and valleys running from NNW to SSE at 3900–4400 m. The commercial Remotely Operated Vehicle (ROV) *Remora III*, operated by Phoenix International Holdings, performed video surveys and sample collections at four randomly-located sites within UK-1 Stratum A in the UK-1 contract area. Additionally, surveys were done ~250 km to the east of the UK-1 contract area, at a site called ‘EPIRB’ centered at 13°40′ N, 114°24′ W (Fig. 1). Work at the EPIRB site was dictated by an emergency response to an Emergency Position Indicating Radio Beacon (EPIRB) distress signal and, although unplanned, provided a useful broader context for our study. The ROV was equipped with two manipulators, four

ROS QLEDIII lights, one 1Cam Alpha Component high-definition downward-looking "science" video camera (1080p video and 24.1 megapixel stills) and one standard-definition forward-looking "pilot" video camera. During surveys, the vehicle had substantial difficulty maintaining constant altitude, direction and velocity over the seabed, thereby limiting the availability of usable imagery and also the collection of specimens.

The AB02 cruise focused on a 30x30-km stratum (UK-1 Stratum B) centered at 12°28' N, 116°36' W in the central portion of the UK-1 exploration contract area (Fig. 1). During the AB02 cruise, multibeam bathymetric surveys indicated an abyssal seafloor dominated by numerous high-relief volcanic seamounts between 3500-4300 m. The Autonomous Underwater Vehicle (AUV) *REMUS 6000*, operated by Woods Hole Oceanographic Institution, performed image surveys at five randomly-located sites within UK-1 Stratum B (Fig. 1). The AUV was equipped with four ROS QLEDIII lights, and one Prosilica GT3400 high-definition downward-looking still camera (9 megapixel stills).

Sample collection

The ROV was the primary tool used to collect specimens on the AB01 cruise, however due to significant difficulties, a limited number of megafauna was successfully sampled. As a result, megafauna that were collected serendipitously by the box corer, megacorer, and Brenke epibenthic sled were also included in this study (Amon et al. 2016b). As there was no ROV on AB02, we again relied on samples collected by chance with the box corer, megacorer, and Brenke epibenthic sled. Once the respective sampling equipment was on deck, megafauna were quickly transferred to containers of chilled seawater, photographed, and a tissue subsample taken for DNA analyses. DNA samples were preserved in 80% ethanol and the remainder of the animal was preserved in buffered 4% formalin-seawater solution or 95% ethanol, depending on the taxon. On board, all collected specimens were also imaged, with the resulting images included in this manuscript. After the cruise, morphological samples were sent to taxonomic experts for identification and all specimens sequenced for a range of DNA markers at the Natural History Museum, London, with tissue samples subsequently archived and made openly-available for future taxonomic work (Dahlgren et al. 2016, Glover et al. 2015, Glover et al. 2016). All collected specimens were used for taxonomic identifications including ground-truthing identifications based on images.

Megafaunal image surveys and analyes

All imagery from both "pilot" and "science" cameras on the ROV (covering roughly 8,000m^2) collected during AB01 was used during the creation of this atlas (Amon et al. 2016b). All imagery from the AUV (27,178 images covering roughly 500,000 m^2) collected during AB02 was also used, although the majority of these images (>20,000 images) were at too high an altitude (>6 m) for megafauna to be resolved and identified. All video from both cameras on the ROV, as well as from the AUV, were viewed multiple times and frames archived of each identifiable megafaunal morphotype. The ROV imagery from the AB01 cruise was higher resolution than the imagery collected by the AUV during the AB02 cruise.

The criteria used for selection of megafaunal morphospecies was that individuals were greater than 2 cm in maximum dimension and that there was sufficient detail to identify them to a putative 'species-level' morphotype or morphospecies (Amon et al. 2016b). However, this only applied to imagery from AB01 as the AUV imagery collected during AB02 was of poor resolution resulting in only megafauna above 5 cm in the largest dimension being included in this atlas. Morphospecies that could not be identified to species but appeared morphologically distinct were assigned a unique informal species name (e.g. *Echinoidea* morphospecies 1). These were identified by taxonomic experts or by using the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/) (Martinez-Arbizu et al. 2013), as well as Bluhm and Gebruk 1999, Foell and Pawson 1986, Pawson 1983, Pawson and Foell 1986, Roux 2004, Roux and Pawson 1999, Tilot 2006. Morphospecies from this study that matched morphotypes listed in the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" have had a section titled "Nomenclature" added to their data, in which the identification from the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" has been included. This is in an effort to provide coherence between these CCZ atlases. For morphospecies that were morphologically similar to a well-defined species name, we use the open nomenclature expression "cf.", although a precautionary approach was taken. Specimens in this atlas that were collected have undergone (relevant GenBank numbers are included) or are currently undergoing molecular analyses (Glover et al. 2016; Glover et al., unpublished data).

This process provided an estimate of the number of echinoderm morphospecies in the UK-1 contract area and eastern CCZ, and will aid in delimiting species ranges in the CCZ. However, since the majority of the morphospecies were not collected, it is impossible to confirm species identities in most cases or undertake systematic studies on this fauna (Amon et al. 2016b).

Echinoderms of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Echinodermata

Class Asteroidea de Blainville, 1830

Order Brisingida Fisher, 1928

Family Freyellidae Downey, 1986

Genus *Freyella* Perrier, 1885

cf. *Freyella* morphospecies

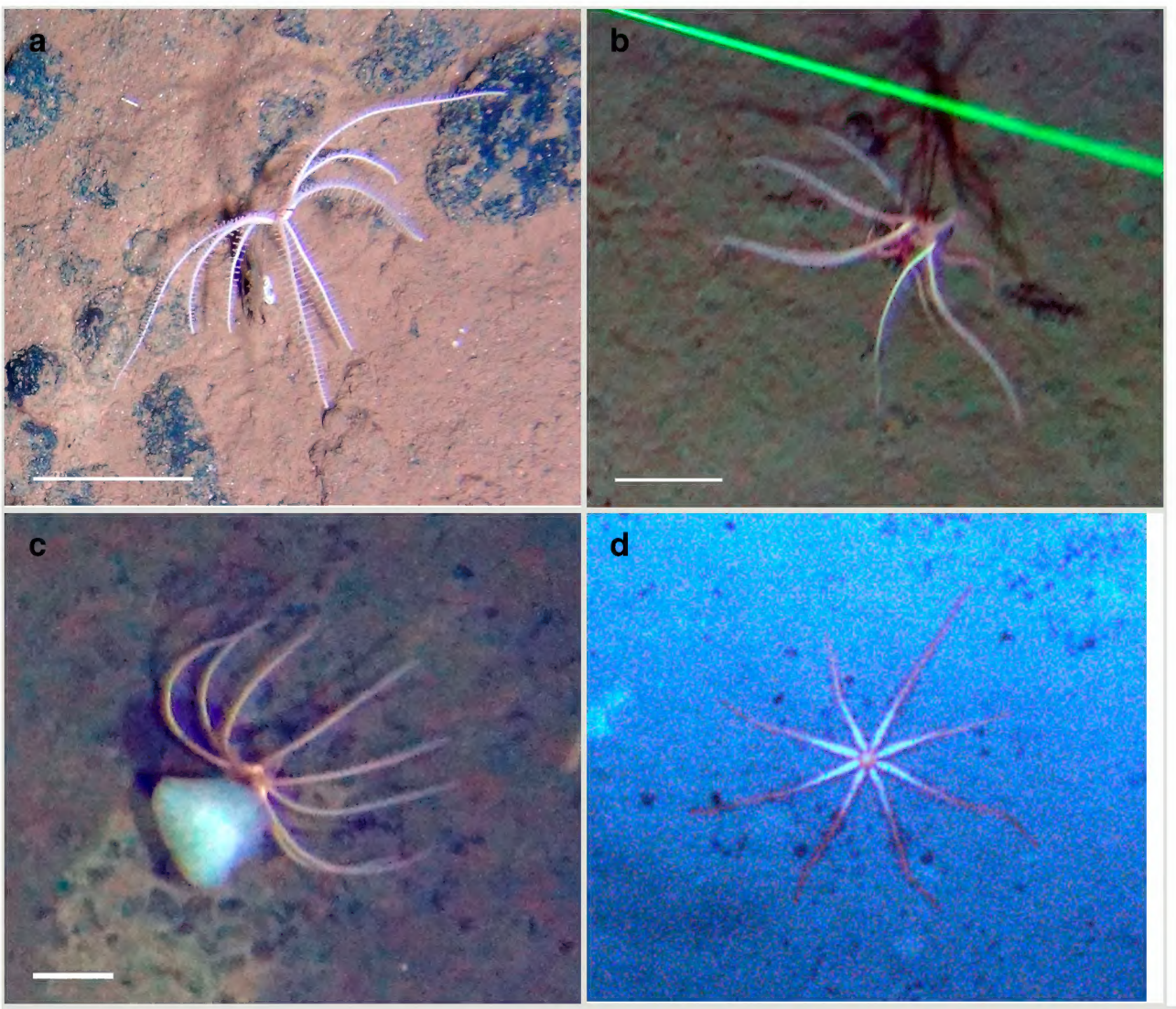

Figure 2.

cf. *Freyella* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-d) correspond with the relevant data above.

a: cf. *Freyella* morphospecies attached to dead sponge stalk. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: cf. *Freyella* morphospecies attached to dead sponge stalk. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: cf. *Freyella* morphospecies attached to a live sponge. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
d: cf. *Freyella* morphospecies in situ on seafloor. Image attribution: Woods Hole Oceanographic Institution.

Materials

a. scientificName: *Freyella* sp.; taxonConceptID: cf. *Freyella* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: genus; genus: *Freyella*; scientificNameAuthorship: Perrier, 1885; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4020; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8551; decimalLongitude: -116.5477; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 3:09; habitat: Abyssal polymetallic-nodule field;

fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Freyella* sp.; taxonConceptID: cf. *Freyella* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: genus; genus: *Freyella*; scientificNameAuthorship: Perrier, 1885; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4050; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9588; decimalLongitude: -116.5605; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 2:20; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Freyella* sp.; taxonConceptID: cf. *Freyella* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: genus; genus: *Freyella*; scientificNameAuthorship: Perrier, 1885; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3943; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4133; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:03; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

d. scientificName: *Freyella* sp.; taxonConceptID: cf. *Freyella* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae;

taxonRank: genus; genus: *Freyella*; scientificNameAuthorship: Perrier, 1885; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4250; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5011; decimalLongitude: -116.6442; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 11:08; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 2

Genus *Freyastera* Sladen, 1889

Freyastera cf. *benthophila* Sladen, 1889

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this species is listed as "*Freyastera* sp. morphotype".

Materials

a. scientificName: *Freyastera benthophila*; taxonConceptID: *Freyastera* cf. *benthophila*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: species; genus: *Freyastera*; scientificNameAuthorship: Sladen, 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4064; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8635; decimalLongitude: -116.5486; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:07; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Freyastera benthophila*; taxonConceptID: *Freyastera* cf. *benthophila*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: species; genus: *Freyastera*; scientificNameAuthorship: Sladen,

1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4251; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4979; decimalLongitude: -116.6464; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 22:38; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Freyastera benthophila*; taxonConceptID: *Freyastera* cf. *benthophila*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: species; genus: *Freyastera*; scientificNameAuthorship: Sladen, 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4027; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8609; decimalLongitude: -116.5468; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 1:55; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

d. scientificName: *Freyastera benthophila*; taxonConceptID: *Freyastera* cf. *benthophila*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Brisingida; family: Freyellidae; taxonRank: species; genus: *Freyastera*; scientificNameAuthorship: Sladen, 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4011; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8622; decimalLongitude: -116.5462; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 0:39; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: Frequently observed on sponge stalks, rocks and seafloor; catalogNumber: AB01-RV06-CS-10; recordNumber: AB01-RV06-CS-10; NHM413; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: b7ffe7a2-7be1-4d4fb784-7aaecf0ee743; 5023520; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M,

Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519550 | KU519518 | KU519535; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 3

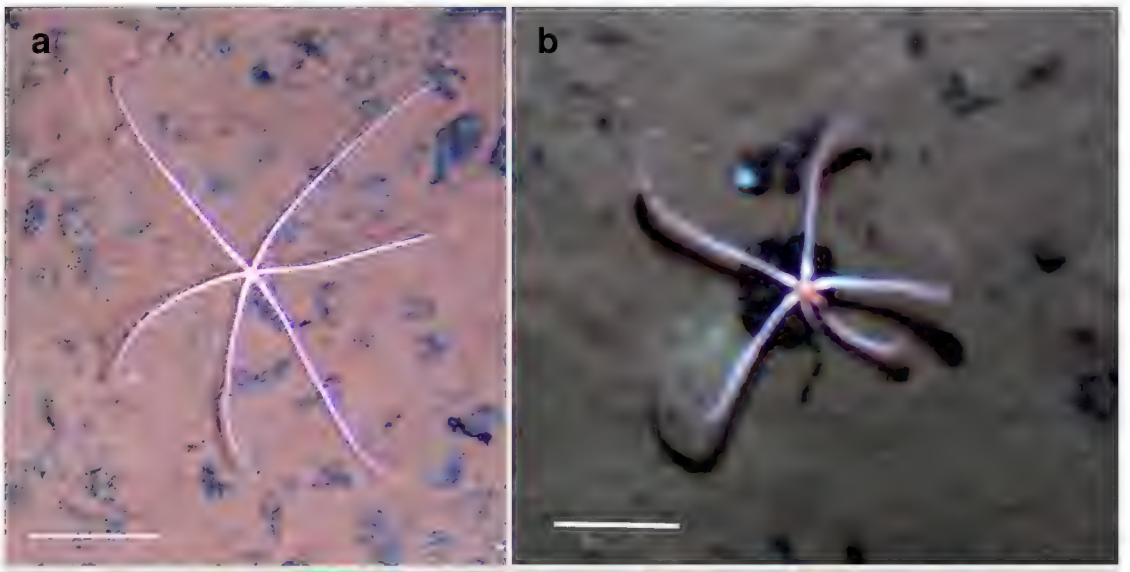

Figure 3.

Freyastera cf. *benthophila* observed in the UK-1 exploration contract area. Images (a-d) correspond with the relevant data above.

a: *Freyastera* cf. *benthophila* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: *Freyastera* cf. *benthophila* attached to a polymetallic nodule on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

c: *Freyastera* cf. *benthophila* attached to dead stalk regenerating sixth arm. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

d: Tentacle of *Freyastera* cf. *benthophila* only partly recovered. Scale bar is 2 cm. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.

Order Paxillosida Perrier, 1884

cf. *Paxillosida* morphospecies 1

Material

a. scientificName: *Paxillosida* sp.; taxonConceptID: cf. *Paxillosida* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; taxonRank: order; scientificNameAuthorship: Perrier, 1884; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4022; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8593; decimalLongitude: -116.5482; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 4

Figure 4.

cf. *Paxillosida* morphospecies 1 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. *Paxillosida* morphospecies 2

Material

a. scientificName: *Paxillosida* sp.; taxonConceptID: cf. *Paxillosida* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; taxonRank: order; scientificNameAuthorship: Perrier, 1884; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4144; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3606; decimalLongitude: -116.5133; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 20:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 5

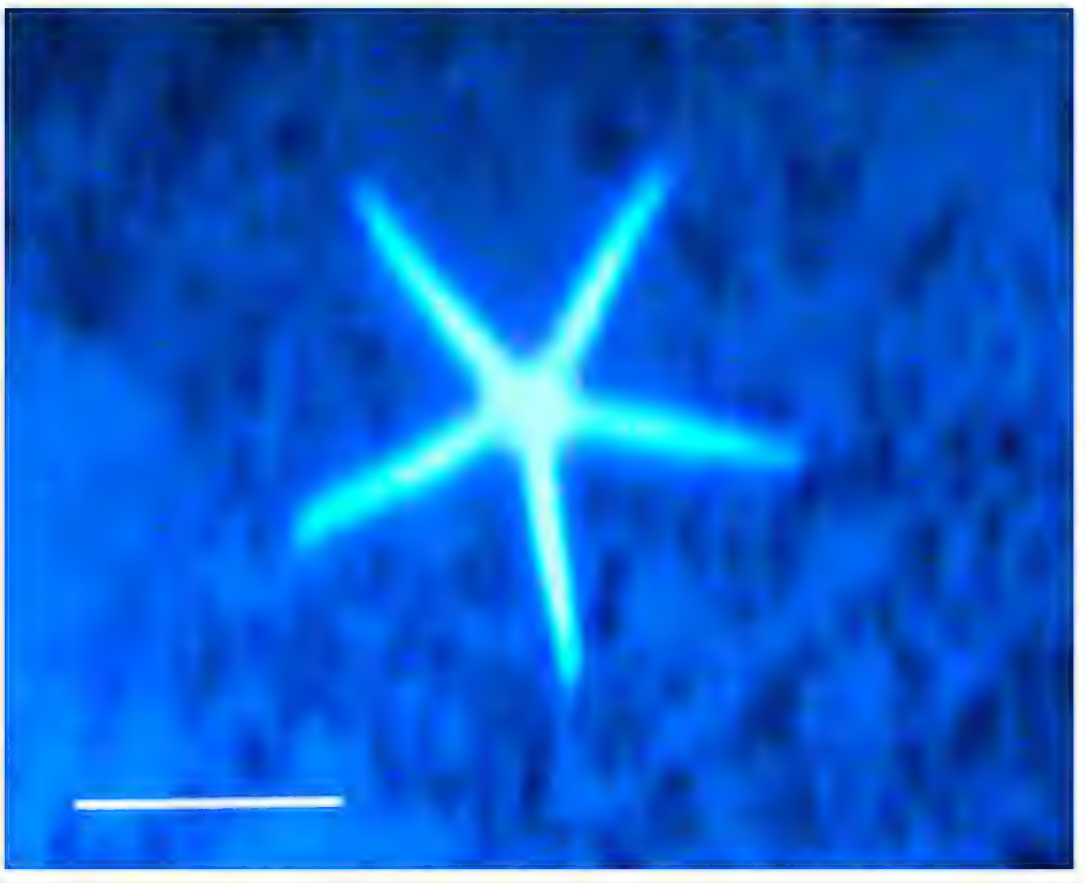

Figure 5.

cf. *Paxillosida* morphospecies 2 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Paxillosida* morphospecies 3

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "Astropectinidae *Dytaster* morphotype".

Material

a. scientificName: *Paxillosida* sp.; taxonConceptID: cf. *Paxillosida* morphospecies 3; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; taxonRank: order; scientificNameAuthorship: Perrier, 1884; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4159; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3655; decimalLongitude: -116.5184; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 20:56; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 6

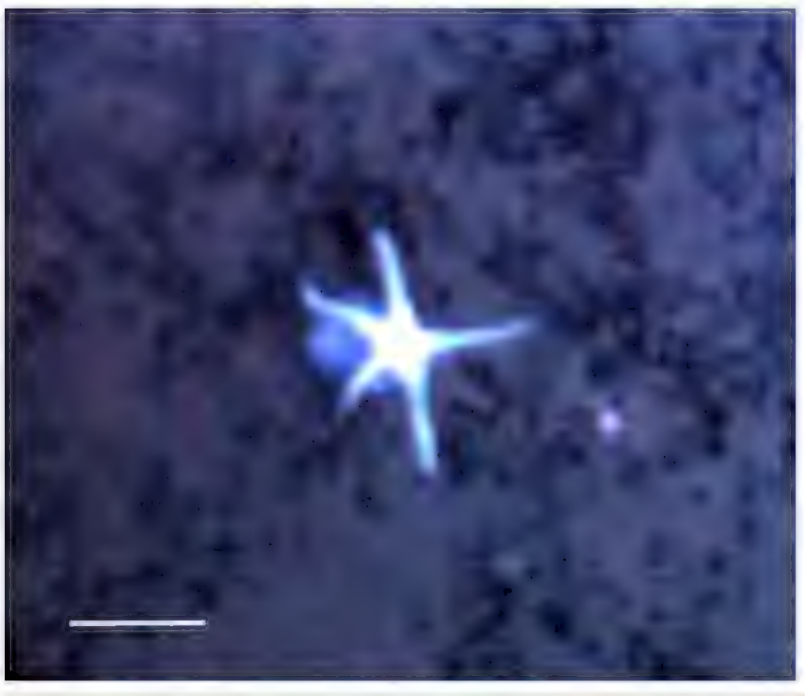

Figure 6.

cf. *Paxillosida* morphospecies 3 observed in situ on sponge on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Porcellanasteridae Sladen, 1883

cf. *Porcellanasteridae* morphospecies

Materials

a. scientificName: *Porcellanasteridae* sp.; taxonConceptID: cf. *Porcellanasteridae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: family; scientificNameAuthorship: Sladen, 1883; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4029; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8632; decimalLongitude: -116.5464; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 9:11; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Porcellanasteridae* sp.; taxonConceptID: cf. *Porcellanasteridae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: family; scientificNameAuthorship: Sladen, 1883; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3950; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6798; decimalLongitude: -114.4144; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 13:27; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 7

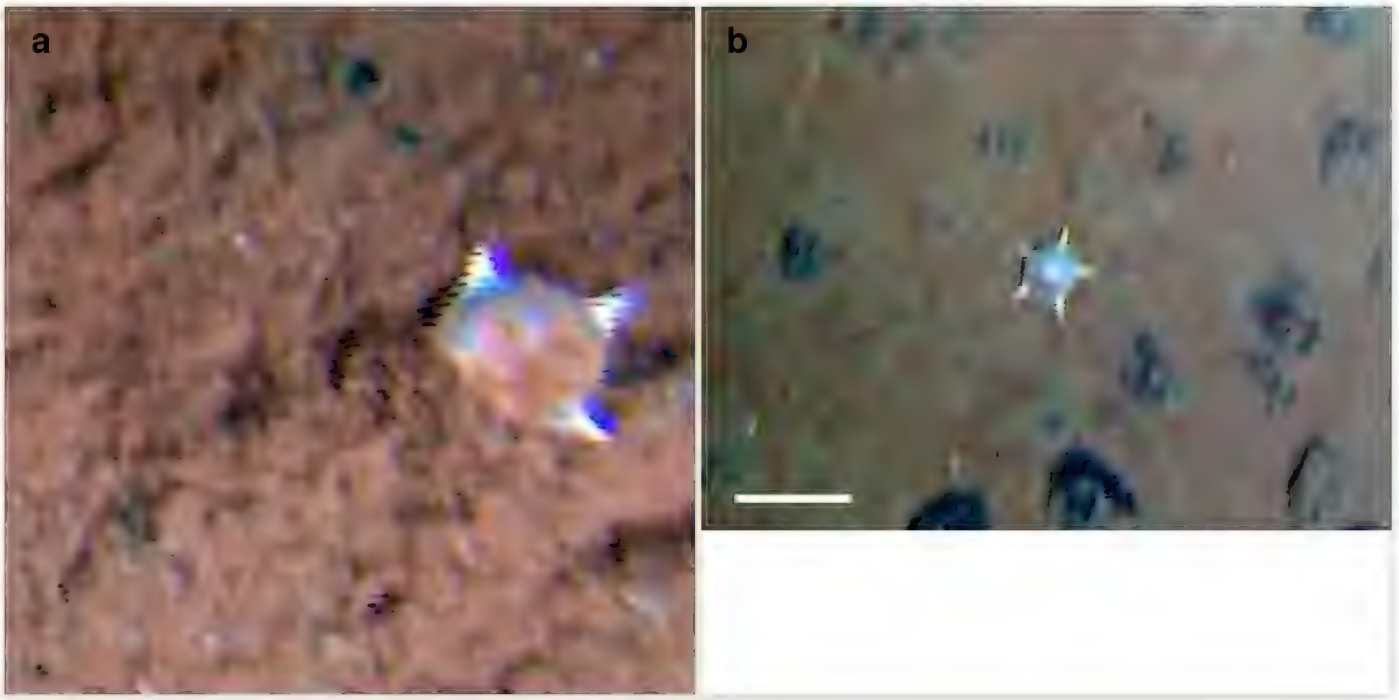

Figure 7.

cf. *Porcellanasteridae* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data above.

a: cf. *Porcellanasteridae* morphospecies in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Porcellanasteridae* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Porcellanaster* Wyville Thomson, 1877

cf. *Porcellanaster* morphospecies

Materials

a. scientificName: *Porcellanaster* sp.; taxonConceptID: cf. *Porcellanaster* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: genus; genus: *Porcellanaster*; scientificNameAuthorship: Wyville Thomson, 1877; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8501; decimalLongitude: -116.6456; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 16:24; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Porcellanaster* sp.; taxonConceptID: cf. *Porcellanaster* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: genus; genus: *Porcellanaster*; scientificNameAuthorship: Wyville Thomson, 1877; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3947; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4137; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 9:58; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 8

Figure 8.

cf. *Porcellanaster* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data above.

a: cf. *Porcellanaster* morphospecies in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Porcellanaster* morphospecies in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Porcellanaster ceruleus Wyville Thomson, 1877

Material

a. scientificName: *Porcellanaster ceruleus*; taxonConceptID: *Porcellanaster ceruleus*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: species; genus: *Porcellanaster*; scientificNameAuthorship: Wyville Thomson, 1877; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4076; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7558; decimalLongitude: -116.4867; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 500; samplingProtocol: Brenke Epibenthic Sled; eventDate: 2013-10-17; eventTime: 1:50; habitat: Abyssal polymetallic-nodule field; fieldNumber: Brenke Epibenthic Sled (EB04); individualCount: 2; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-EB04-NHM253; recordNumber: AB01-EB04-NHM253; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: 95d0bd7f-0df9-47e4-8003-cd12007d54b4; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519570 | KU519525 | KU519542; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: NHMUK; collectionCode: ZOO; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 9

Figure 9.

Porcellanaster ceruleus after collection from the UK-1 exploration contract area. Aboral view on left and oral view on right. Image corresponds with the data above. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.

Genus *Styracaster* Sladen, 1883

Styracaster paucispinus Ludwig, 1907

Material

a. scientificName: *Syracaster paucispinus*; taxonConceptID: *Syracaster paucispinus*; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Paxillosida; family: Porcellanasteridae; taxonRank: species; genus: *Styracaster*; scientificNameAuthorship: Ludwig, 1907; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4237; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5212; decimalLongitude: -116.698; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Megacorer; eventDate: 2015-03-09; eventTime: 10:56; habitat: Abyssal polymetallic-nodule field; fieldNumber: Megacorer 17 (MC17); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB02-MC17-CS-31; recordNumber: AB02-MC17-CS-31; NHM1608; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2015; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 10

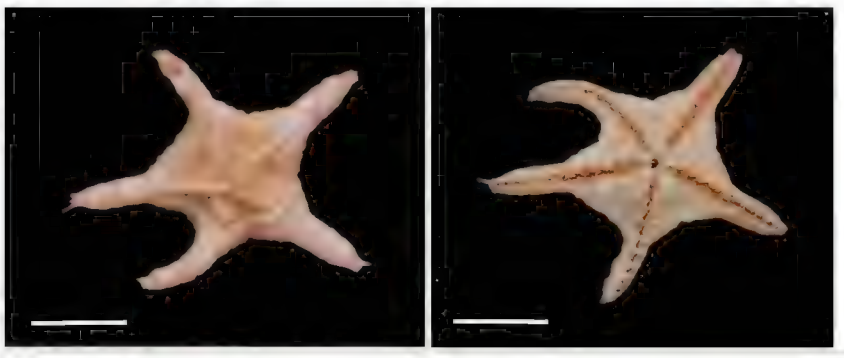

Figure 10.

Styracaster paucispinus after collection from the UK-1 exploration contract area. Images (a) and (b) correspond with the data in (a) above.

a: Aboral view of *Styracaster paucispinus* after collection. The pink dots on the specimen are parasites. Scale bar is 1 cm. Image attribution: DJ Amon and CR Smith.
b: Oral view of *Styracaster paucispinus* after collection. Scale bar is 1 cm. Image attribution: DJ Amon and CR Smith.

Order Velatida Perrier, 1884

Family Pterasteridae Perrier, 1875

cf. *Pterasteridae* morphospecies 1

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Pteraster* morphotype".

Materials

a. scientificName: *Pterasteridae* sp.; taxonConceptID: cf. *Pterasteridae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Velatida; family: Pterasteridae; taxonRank: family; scientificNameAuthorship: Perrier, 1875; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4059; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9669; decimalLongitude: -116.55796; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 0:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Pterasteridae* sp.; taxonConceptID: cf. *Pterasteridae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Velatida; family: Pterasteridae; taxonRank: family; scientificNameAuthorship: Perrier, 1875; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4226; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5783; decimalLongitude: -116.6872; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 3:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language:

en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 11

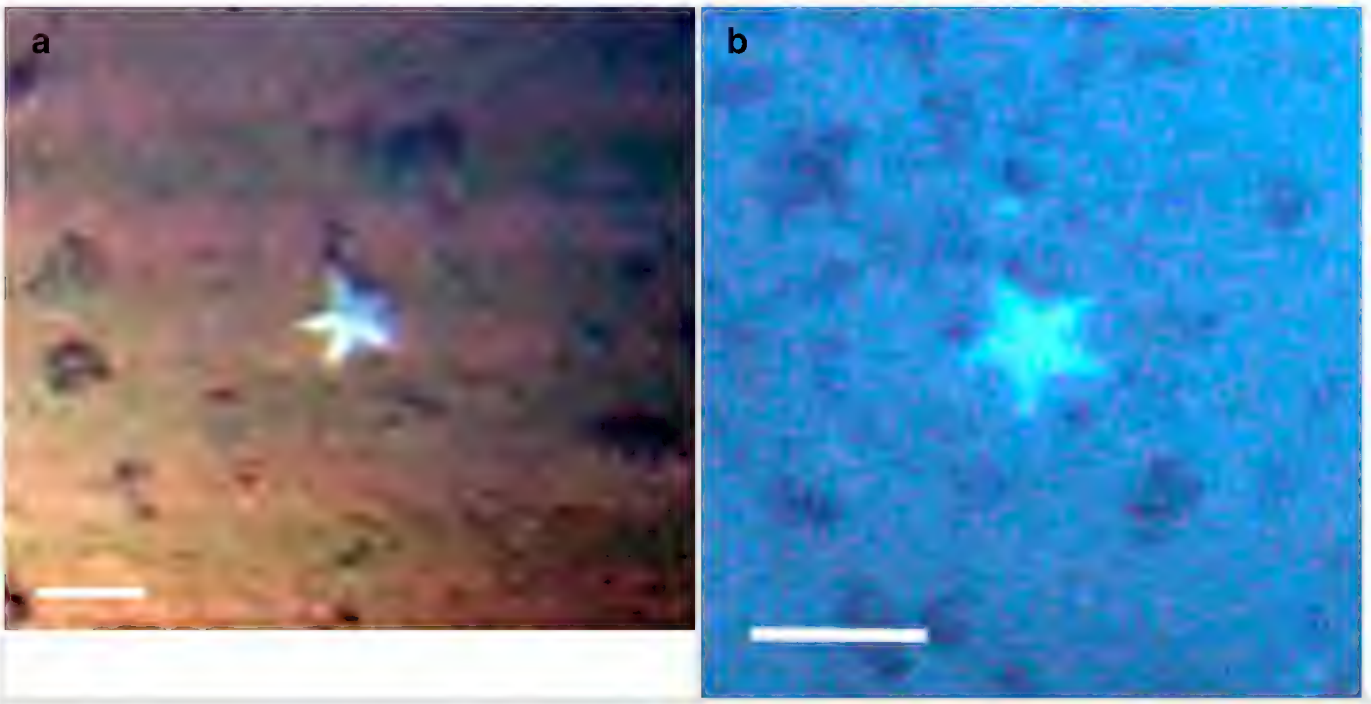

Figure 11.

cf. *Pterasteridae* morphospecies 1 observed in the UK-1 exploration contract area. Images correspond with the data above.

a: cf. *Pterasteridae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Pterasteridae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Pterasteridae* morphospecies 2

Material

a. scientificName: *Pterasteridae* sp.; taxonConceptID: cf. *Pterasteridae* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Velatida; family: Pterasteridae; taxonRank: family; scientificNameAuthorship: Perrier, 1875; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4107; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.85096; decimalLongitude: -116.6453; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 16:48; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014;

identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 12

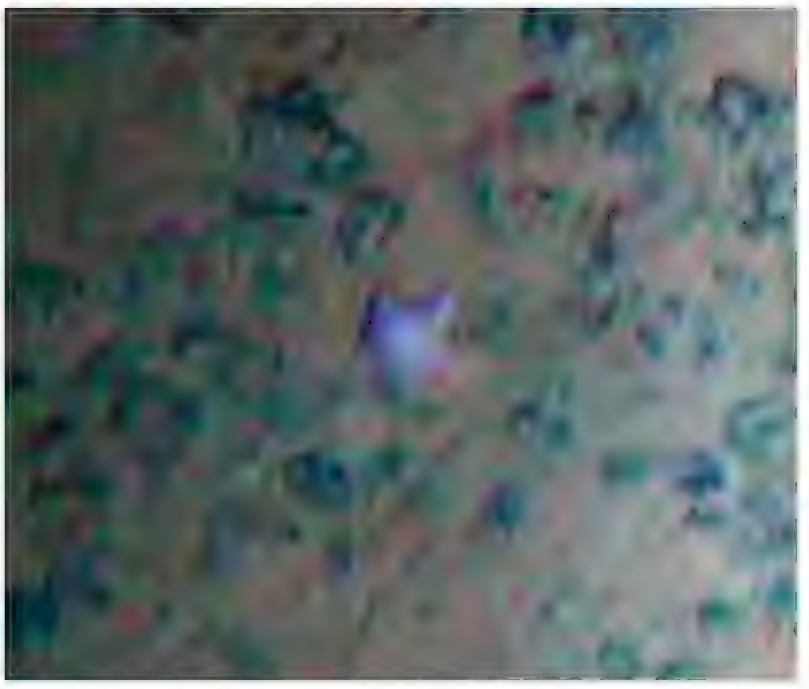

Figure 12.

cf. *Pterasteridae* morphospecies 2 observed in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Hymenaster* Thomson, 1873

cf. *Hymenaster* morphospecies 1

Material

a. scientificName: *Hymenaster* sp.; taxonConceptID: cf. *Hymenaster* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Velatida; family: Pterasteridae; taxonRank: genus; genus: *Hymenaster*; scientificNameAuthorship: Thomson, 1873; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4027; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.86097; decimalLongitude: -116.5468; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 1:54; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014;

identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 13

Figure 13.

cf. *Hymenaster* morphospecies 1 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. *Hymenaster* morphospecies 2

Material

a. scientificName: *Hymenaster* sp.; taxonConceptID: cf. *Hymenaster* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Asteroidea; order: Velatida; family: Pterasteridae; taxonRank: genus; genus: *Hymenaster*; scientificNameAuthorship: Thomson, 1873; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4022; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8577; decimalLongitude: -116.5479; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 3:46; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Christopher Mah, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 14

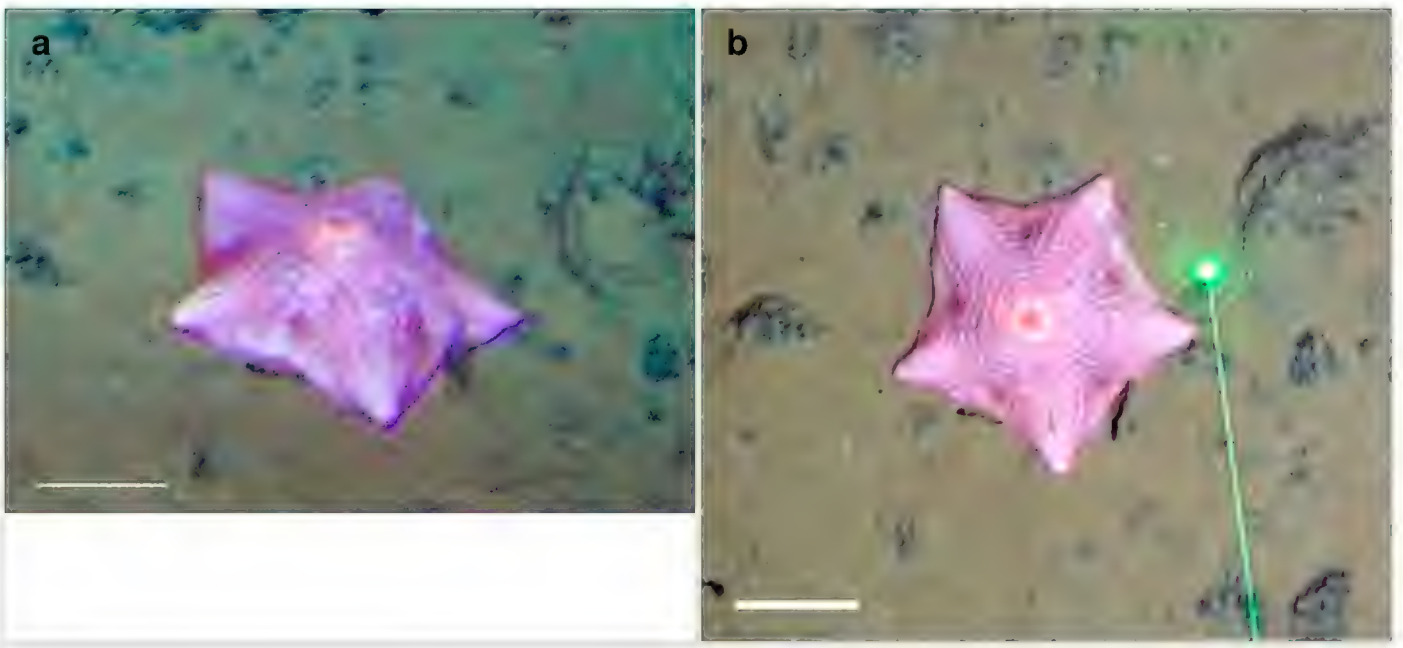

Figure 14.

cf. *Hymenaster* morphospecies 2 observed in the UK-1 exploration contract area. Both image (a) and image (b) correspond with the data in (a) above.

a: Side view of cf. *Hymenaster* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: Aboral view of cf. *Hymenaster* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Class Crinoidea

Order Comatulida Sieverts-Doreck, 1953

cf. *Comatulida* morphospecies 1

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "Featherstar sp. 1".

Materials

a. scientificName: *Comatulida* sp.; taxonConceptID: cf. *Comatulida* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Comatulida; taxonRank: order; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3914; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6793; decimalLongitude: -114.4072; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:52; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler;

occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Comatulida* sp.; taxonConceptID: cf. *Comatulida* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Comatulida; taxonRank: order; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4025; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8639; decimalLongitude: -116.5487; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:14; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 15

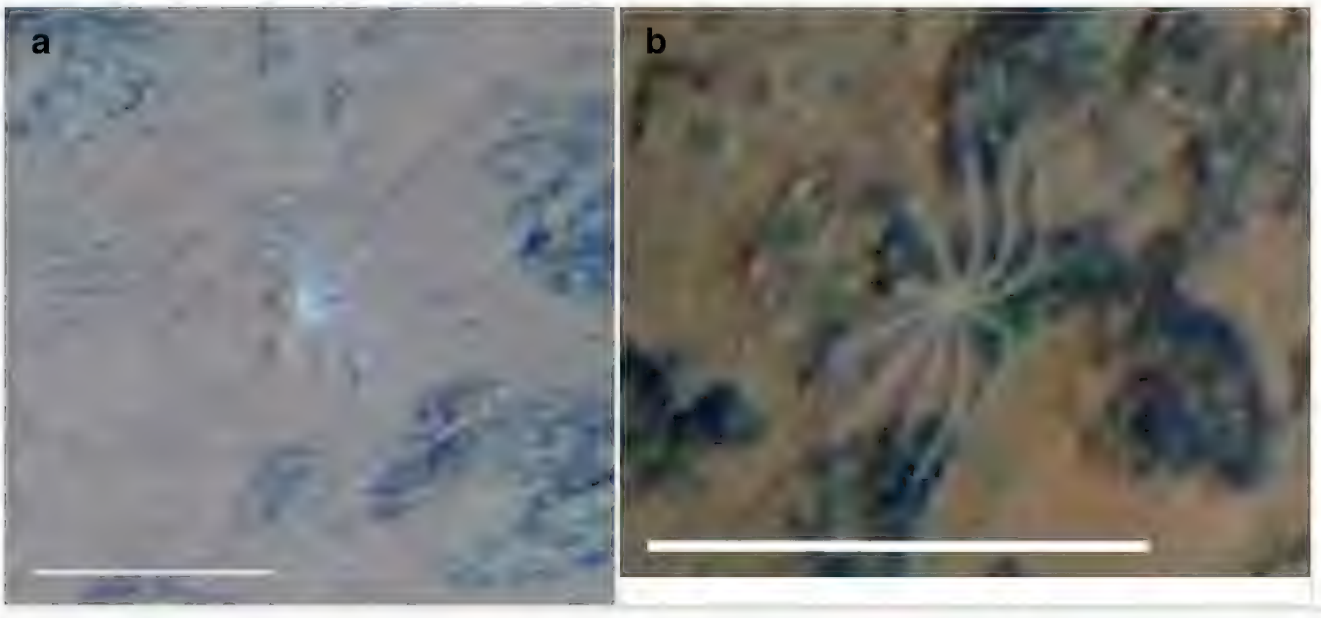

Figure 15.

cf. *Comatulida* morphospecies 1 observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data above.

a: cf. *Comatulida* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Comatulida* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. *Comatulida* morphospecies 2

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Pentametrocrinus* sp. 1".

Material

a. scientificName: *Comatulida* sp.; taxonConceptID: cf. *Comatulida* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Comatulida; taxonRank: order; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8498; decimalLongitude: -116.6458; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 13:48; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 16

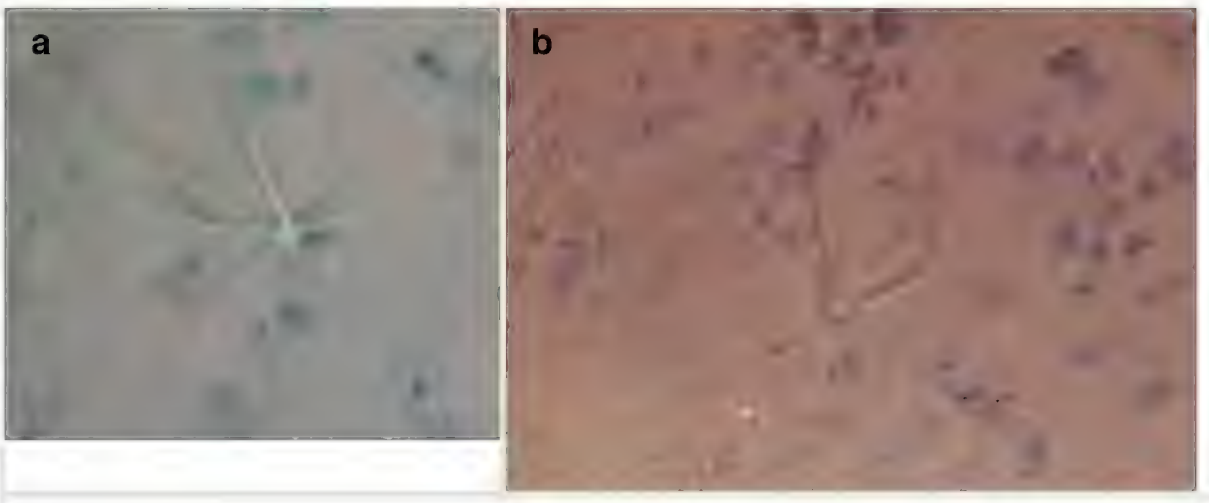

Figure 16.

cf. *Comatulida* morphospecies 2 observed in the UK-1 exploration contract area. Image (a-b) correspond with the data in (a) above.

a: cf. *Comatulida* morphospecies 2 in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai’i.

b: cf. *Comatulida* morphospecies 2 in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai’i.

Family Bathycrinidae Bather, 1899

Genus *Bathycrinus* Thomson, 1872

Bathycrinus cf. *equatorialis* A.H. Clark, 1908

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "Bourgueticrinina sp. 1".

Materials

a. scientificName: *Bathycrinus equatorialis*; taxonConceptID: *Bathycrinus* cf. *equatorialis*; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Comatulida; family: Bathycrinidae; taxonRank: species; genus: *Bathycrinus*; scientificNameAuthorship: AH Clark, 1908; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4071; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7605; decimalLongitude: -116.468; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:14; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492.; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Bathycrinus equatorialis*; taxonConceptID: *Bathycrinus* cf. *equatorialis*; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Comatulida ; family: Bathycrinidae; taxonRank: species; genus: *Bathycrinus*; scientificNameAuthorship: AH Clark, 1908; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3909; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6785; decimalLongitude: -114.406; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:21; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492.; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 17

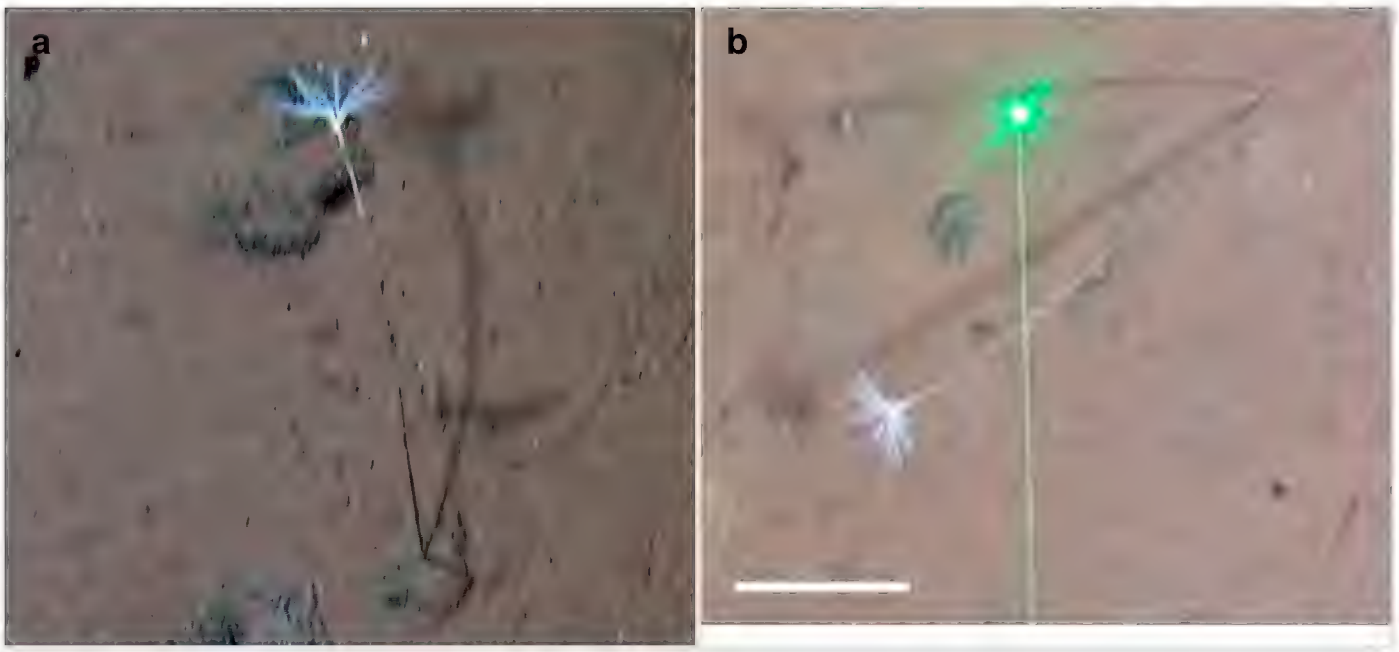

Figure 17.

Bathycrinus cf. *equatorialis* observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data above.

a: *Bathycrinus* cf. *equatorialis* in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: *Bathycrinus* cf. *equatorialis* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Order Hyocrinida Rasmussen, 1978

Family Hyocrinidae Carpenter, 1884

cf. *Hyocrinidae* morphospecies

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "Bourgueticrinina sp. 1".

Material

a. scientificName: *Hyocrinidae* sp.; taxonConceptID: cf. *Hyocrinidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Hyocrinida; family: Hyocrinidae; taxonRank: family; scientificNameAuthorship: Carpenter, 1884; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 3919; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6787; decimalLongitude: -114.4072; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged

only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 18

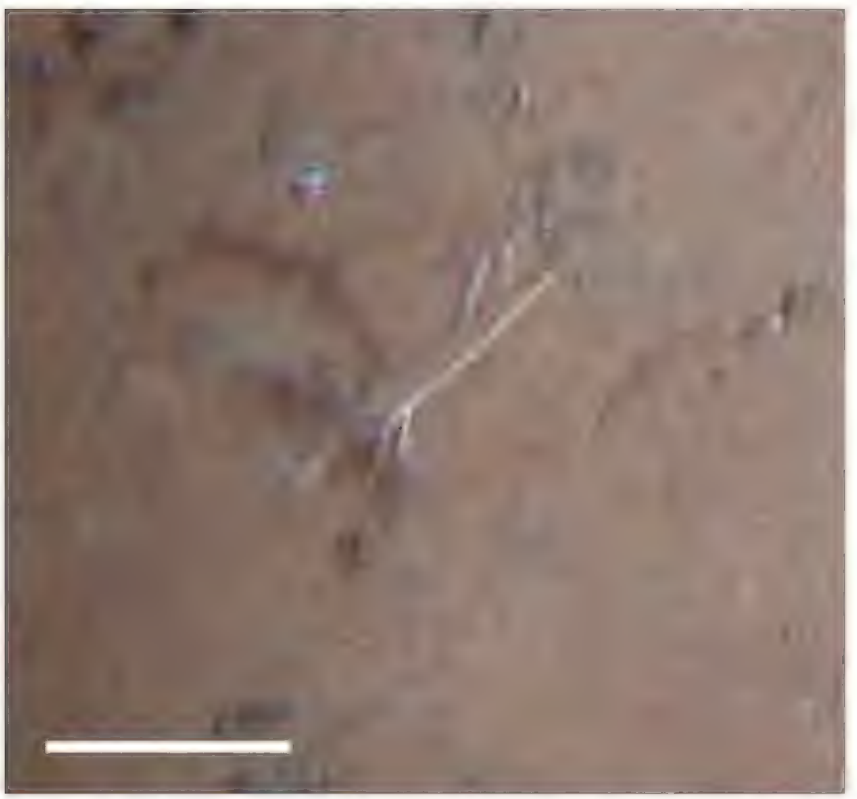

Figure 18.

cf. *Hyocrinidae* morphospecies in situ on seafloor in the eastern CCZ. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Hyocrinus* Thomson, 1876

Hyocrinus cf. *foelli* Roux & Pawson, 1999

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "*Hyocrinidae* sp. 1".

Materials

a. scientificName: *Hyocrinus foelli*; taxonConceptID: *Hyocrinus* cf. *foelli*; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Hyocrinida; family: Hyocrinidae; taxonRank: species; genus: *Hyocrinus*; scientificNameAuthorship: Roux & Pawson, 1999;

waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3944; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.41297; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016, 6. doi: 10.1038/srep30492.; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationReferences: Roux M & Pawson DL. Two New Pacific Ocean Species of Hyocrinid Crinoids (Echinodermata),with Comments on Presumed Giant-Dwarf Gradients Related to Seamountsand Abyssal Plains. Pacific Science. 1999, 53(3), 289-298; Roux M (2004). New hyocrinid crinoids (Echinodermata) from submersible investigations in the Pacific Ocean. Pacific Science, 58:597-613.; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Hyocrinus foelli*; taxonConceptID: *Hyocrinus* cf. *foelli*; kingdom: Animalia; phylum: Echinodermata; class: Crinoidea; order: Hyocrinida; family: Hyocrinidae; taxonRank: species; genus: *Hyocrinus*; scientificNameAuthorship: Roux & Pawson, 1999; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3919; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6792; decimalLongitude: -114.4079; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016, 6. doi: 10.1038/srep30492; identifiedBy: Michel Roux, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationReferences: Roux M & Pawson DL. Two New Pacific Ocean Species of Hyocrinid Crinoids (Echinodermata),with Comments on Presumed Giant-Dwarf Gradients Related to Seamountsand Abyssal Plains. Pacific Science. 1999, 53(3), 289-298; Roux M (2004). New hyocrinid crinoids (Echinodermata) from submersible investigations in the Pacific Ocean. Pacific Science, 58:597-613.; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 19

Figure 19.

Hyocrinus cf. *foelli* observed in the eastern CCZ. Images (a-b) correspond with the data above.

a: *Hyocrinus* cf. *foelli* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: *Hyocrinus* cf. *foelli* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Class Echinoidea Leske, 1778

cf. *Echinoidea* morphospecies 1

Materials

a. scientificName: *Echinoidea* sp.; taxonConceptID: cf. *Echinoidea* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; taxonRank: class; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4163; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.369004; decimalLongitude: -116.5195; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 16:29; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Echinoidea* sp.; taxonConceptID: cf. *Echinoidea* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; taxonRank: class; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4253; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4963; decimalLongitude: -116.64899; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle;

eventDate: 2015-03-04; eventTime: 0:04; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 20

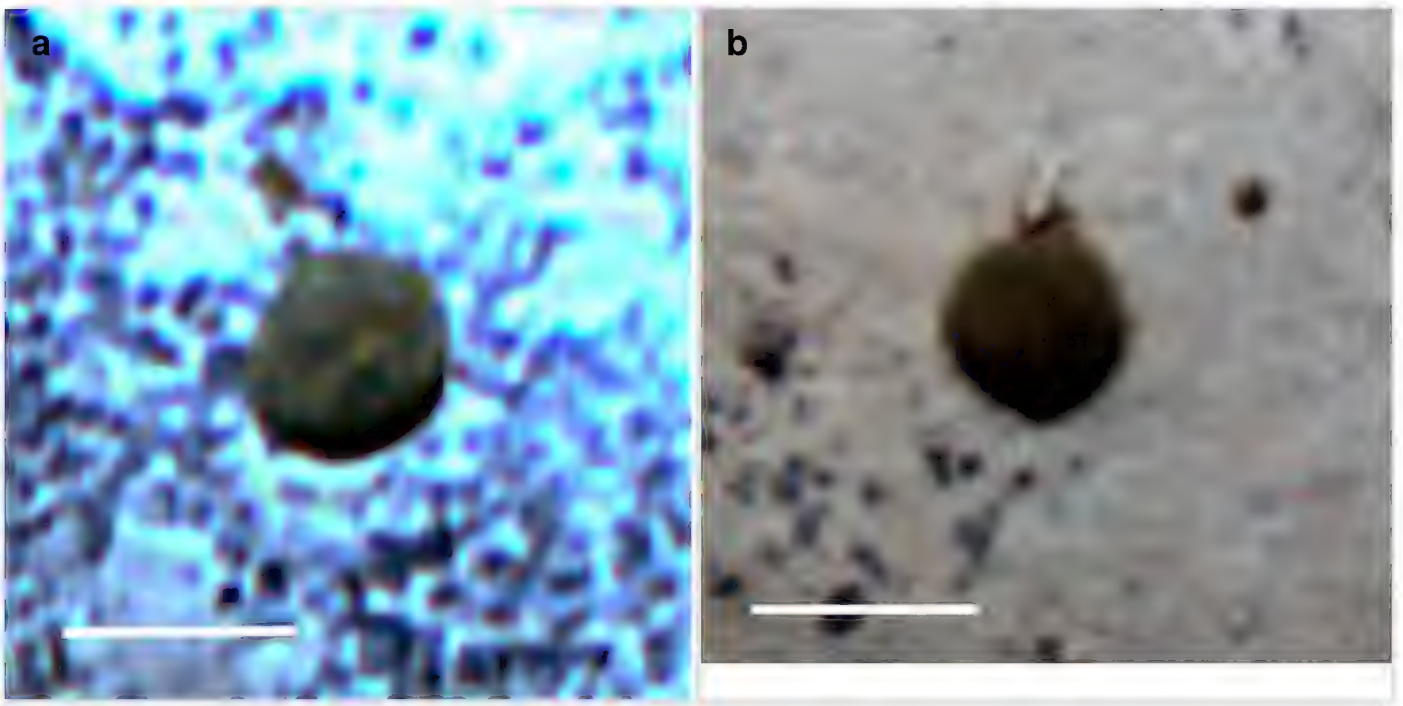

Figure 20.

cf. *Echinoidea* morphospecies 1 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: cf. *Echinoidea* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
b: cf. *Echinoidea* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Echinoidea* morphospecies 2

Material

a. scientificName: *Echinoidea* sp.; taxonConceptID: cf. *Echinoidea* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; taxonRank: class; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4251; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5014; decimalLongitude: -116.64696; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 21:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler;

dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 21

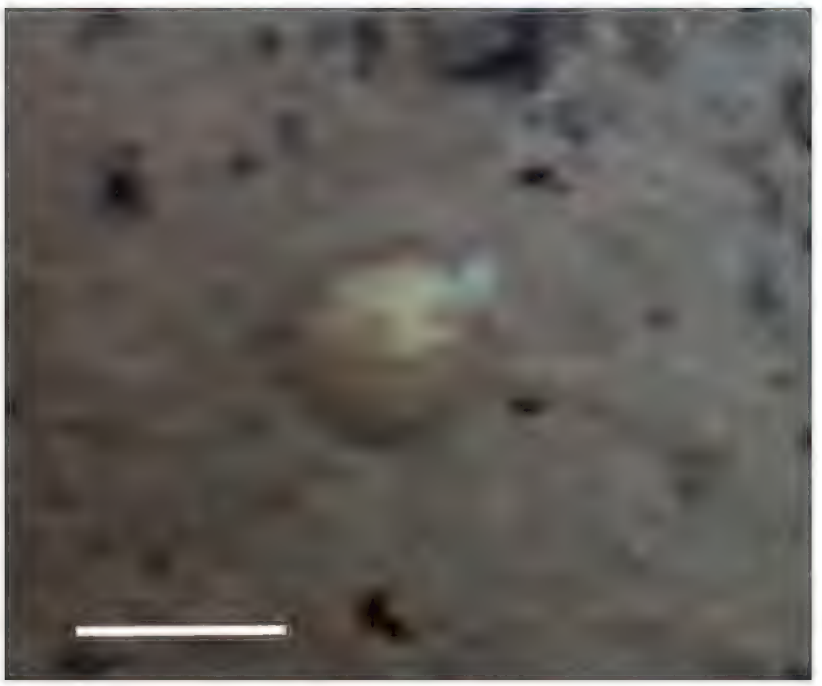

Figure 21.

cf. *Echinoidea* morphospecies 2 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Order Aspidodiadematoida Kroh & Smith, 2010

Family Aspidodiadematidae Duncan 1889

cf. *Aspidodiadematidae* morphospecies

Materials

a. scientificName: *Aspidodiadematidae* sp.; taxonConceptID: cf. *Aspidodiadematidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Aspidodiadematoida; family: Aspidodiadematidae; taxonRank: family; scientificNameAuthorship: Duncan 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4255; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5025; decimalLongitude: -116.6489; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 8:35; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015;

identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Aspidodiadematidae* sp.; taxonConceptID: cf. *Aspidodiadematidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Aspidodiadematoida; family: Aspidodiadematidae; taxonRank: family; scientificNameAuthorship: Duncan 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4108; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8502; decimalLongitude: -116.6457; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 22

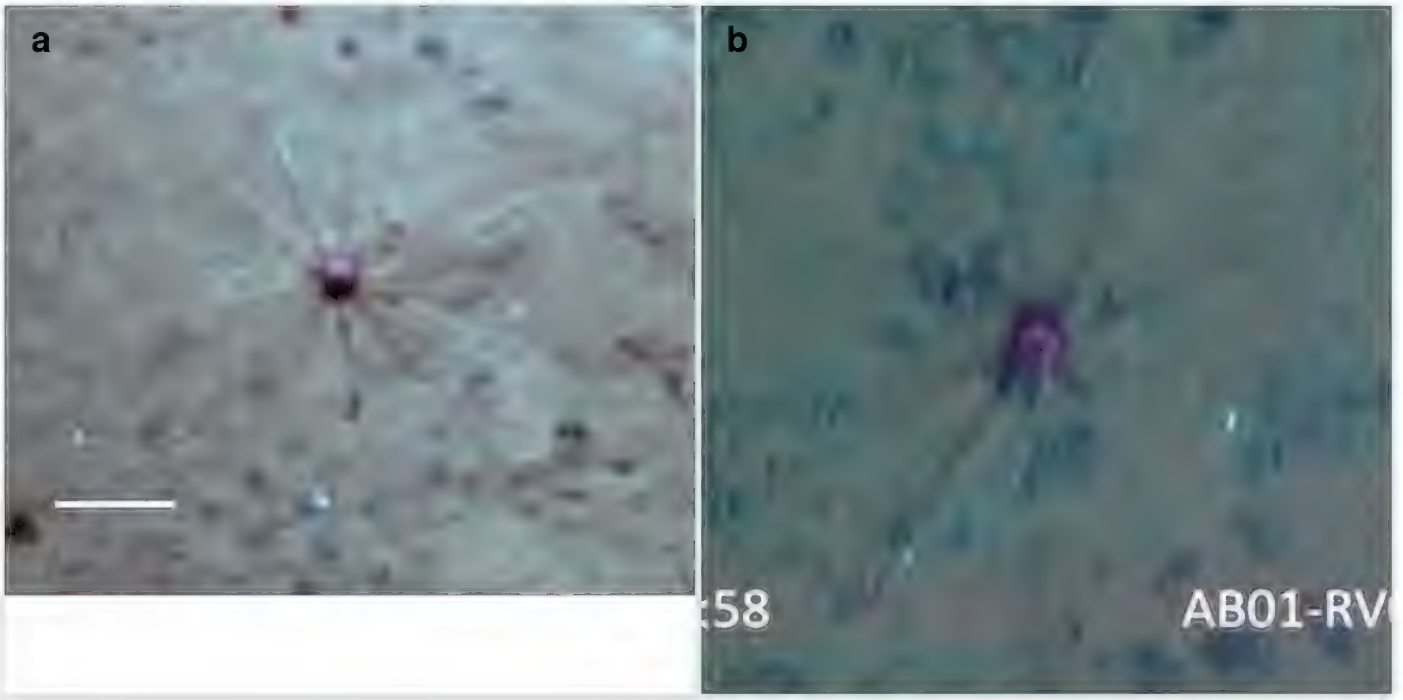

Figure 22.

cf. *Aspidodiadematidae* morphospecies observed in the UK-1 exploration contract. Images (a-b) correspond with the data above.

a: cf. *Aspidodiadematidae* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

b: cf. *Aspidodiadematidae* morphospecies in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Order Holasteroida Durham & Melville, 1957

cf. *Holasteroida* morphospecies 1

Material

a. scientificName: *Holasteroida* sp.; taxonConceptID: cf. *Holasteroida* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; taxonRank: order; scientificNameAuthorship: Durham & Melville, 1957; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5797; decimalLongitude: -116.7271; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:56; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 23

Figure 23.

cf. *Holasteroida* morphospecies 1 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Holasteroida* morphospecies 2

Materials

a. scientificName: *Holasteroida* sp.; taxonConceptID: cf. *Holasteroida* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; taxonRank: order; scientificNameAuthorship: Durham & Melville, 1957; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4253; locationRemarks: RV Thompson Cruise TN319;

decimalLatitude: 12.4965; decimalLongitude: -116.64997; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 6:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Holasteroida* sp.; taxonConceptID: cf. *Holasteroida* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; taxonRank: order; scientificNameAuthorship: Durham & Melville, 1957; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4227; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5796; decimalLongitude: -116.7233; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 11:03; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 24

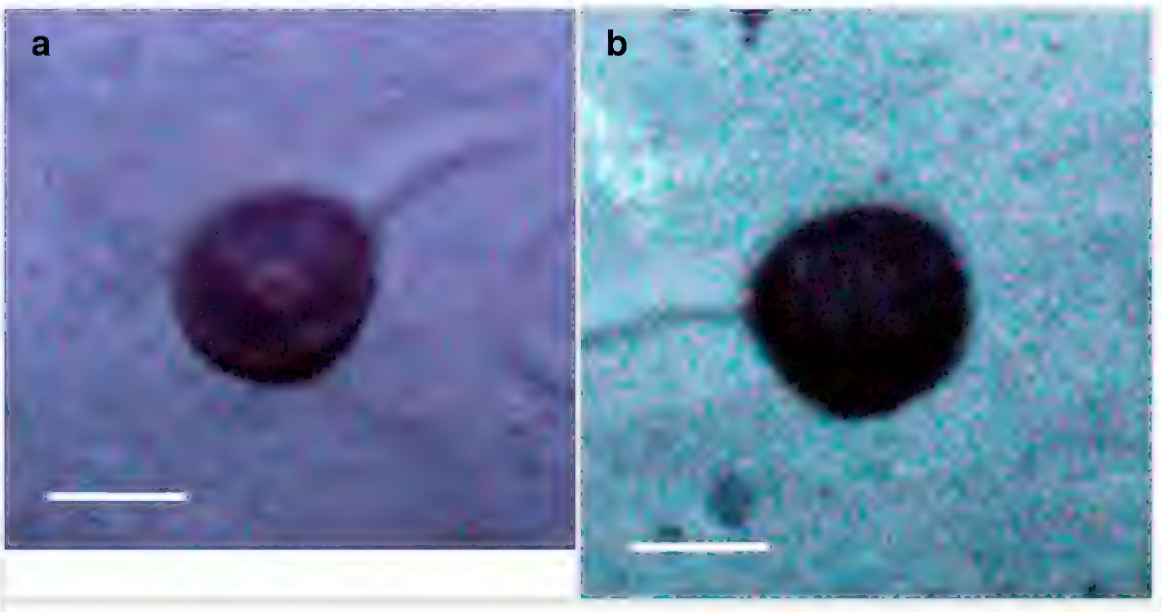

Figure 24.

cf. *Holasteroida* morphospecies 2 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: cf. *Holasteroida* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

b: cf. *Holasteroida* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Pourtalesiidae A. Agassiz, 1881

Genus *Cystocrepis* Mortensen, 1907

cf. *Cystocrepis* morphospecies

Material

a. scientificName: *Cystocrepis* sp.; taxonConceptID: cf. *Cystocrepis* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; family: Pourtalesiidae; taxonRank: genus; genus: *Cystocrepis*; scientificNameAuthorship: Mortensen, 1907; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4022; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.85801; decimalLongitude: -116.5473; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 2:33; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 25

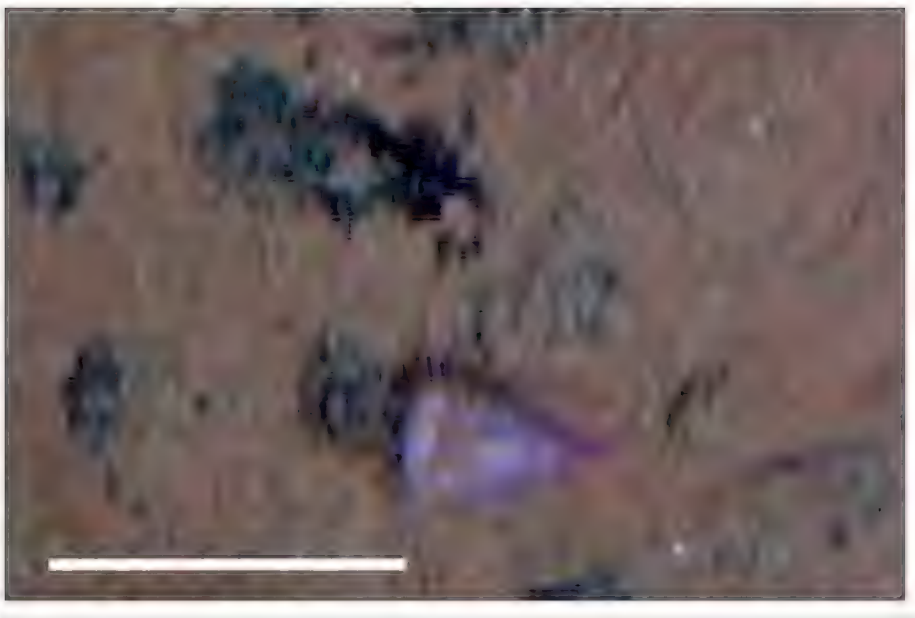

Figure 25.

cf. *Cystocrepis* morphospecies in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Echinocrepis* A. Agassiz, 1879

cf. *Echinocrepis* morphospecies

Materials

a. scientificName: *Echinocrepis* sp.; taxonConceptID: cf. *Echinocrepis* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; family: Pourtalesiidae; taxonRank: genus; genus: *Echinocrepis*; scientificNameAuthorship: A Agassiz, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4026; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8601; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:22; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Echinocrepis* sp.; taxonConceptID: cf. *Echinocrepis* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; family: Pourtalesiidae; taxonRank: genus; genus: *Echinocrepis*; scientificNameAuthorship: A. Agassiz, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4200; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.56795; decimalLongitude: -116.7361; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 10:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Echinocrepis* sp.; taxonConceptID: cf. *Echinocrepis* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; family: Pourtalesiidae; taxonRank: genus; genus: *Echinocrepis*; scientificNameAuthorship: A Agassiz, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4213; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5707; decimalLongitude: -116.7072; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 15:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations:

Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 26

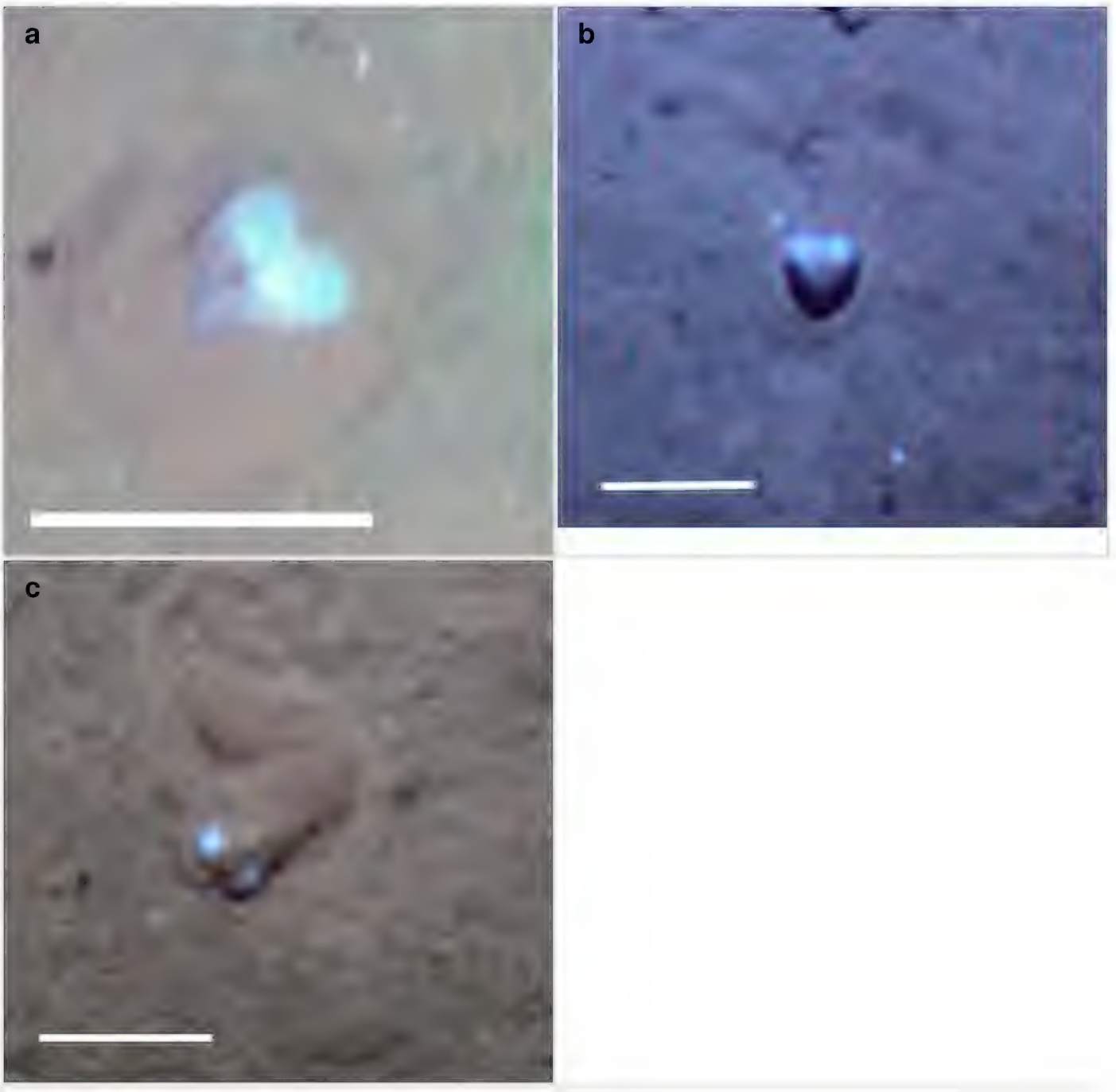

Figure 26.

Echinocrepis morphospecies observed in the UK-1 exploration contract area. Images (a-c) correspond with the data above.

a: cf. *Echinocrepis* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Echinocrepis* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

c: cf. *Echinocrepis* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Urechinidae Duncan, 1889

cf. *Urechinidae* morphospecies

Material

a. scientificName: *Urechinidae* sp.; taxonConceptID: cf. *Urechinidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Holasteroida; family: Urechinidae; taxonRank: family; scientificNameAuthorship: Duncan, 1889; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4020; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8579; decimalLongitude: -116.54799; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 3:50; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 27

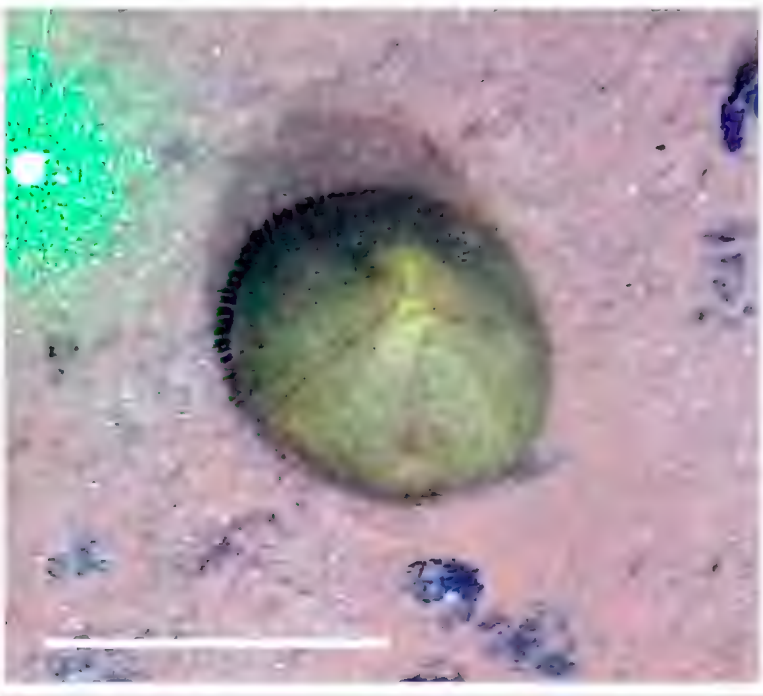

Figure 27.

cf. *Urechinidae* morphospecies in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Order Spatangoida L. Agassiz, 1840

Family Schizasteridae Lambert, 1905

Genus *Aceste* Thomson, 1877

Aceste cf. *ovata* A. Agassiz, 1840

Materials

a. scientificName: *Aceste ovata*; taxonConceptID: *Aceste* cf. *ovata*; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Spatangoida; family: Schizasteridae; taxonRank: species; genus: *Aceste*; scientificNameAuthorship: A Agassiz & HL Clark, 1907; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4028; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8619; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Aceste ovata*; taxonConceptID: *Aceste ovata*; kingdom: Animalia; phylum: Echinodermata; class: Echinoidea; order: Spatangoida; family: Schizasteridae; taxonRank: species; genus: *Aceste*; scientificNameAuthorship: A Agassiz & HL Clark, 1907; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4647; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.531; decimalLongitude: -116.6233; geodeticDatum: WGS85; coordinateUncertaintyInMeters: 500; samplingProtocol: Brenke Epibenthic Sled; eventDate: 2015-02-20; eventTime: 22:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Brenke Epibenthic Sled (EB02); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB02-EB02-CS-18; recordNumber: AB02-EB02-CS-18; NHM1372; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Richard Mooi, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified by

morphology and DNA of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 28

Figure 28.

Aceste cf. *ovata* observed in the UK-1 exploration contract area. Image (a) corresponds with the data in (a) and images (b) and (c) correspond with the data in (b) above.

a: *Aceste ovata* in situ on seafloor. Image attribution: DJ Amon and CR Smith.
b: Aboral view of *Aceste ovata* after collection. Scale bar is 1 cm. Image attribution: DJ Amon and CR Smith.
c: Oral view of *Aceste ovata* after collection. Scale bar is 1 cm. Image attribution: DJ Amon and CR Smith.

Class Holothuroidea

Order Aspidochirotida Grube, 1840

Family Mesothuriidae Smirnov, 2012

Genus *Mesothuria* Ludwig, 1894

cf. *Mesothuria* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Mesothuria* morphotype".

Materials

a. scientificName: *Mesothuria* sp.; taxonConceptID: cf. *Mesothuria* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Mesothuriidae; taxonRank: genus; genus: *Mesothuria*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3918; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6793; decimalLongitude: -114.4074; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:55; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Mesothuria* sp.; taxonConceptID: cf. *Mesothuria* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Mesothuriidae; taxonRank: genus; genus: *Mesothuria*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4221; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5767; decimalLongitude: -116.6767; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 4:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 29

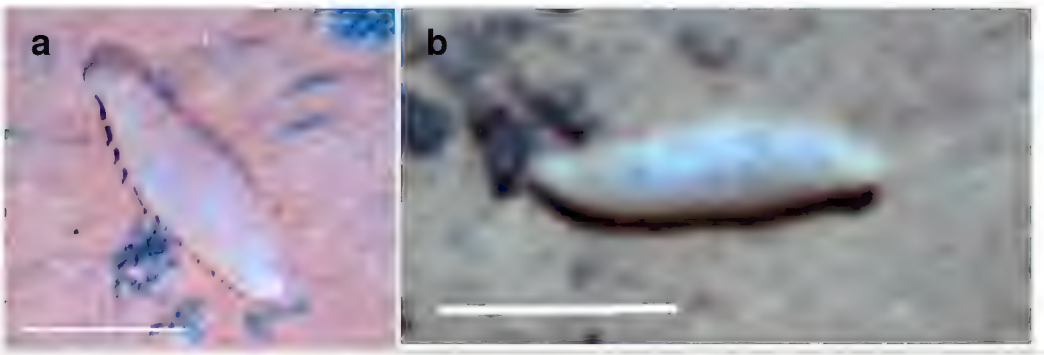

Figure 29.

cf. *Mesothuria* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data above.

a: cf. *Mesothuria* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Mesothuria* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Synallactidae Ludwig, 1894

cf. *Synallactidae* morphospecies 1

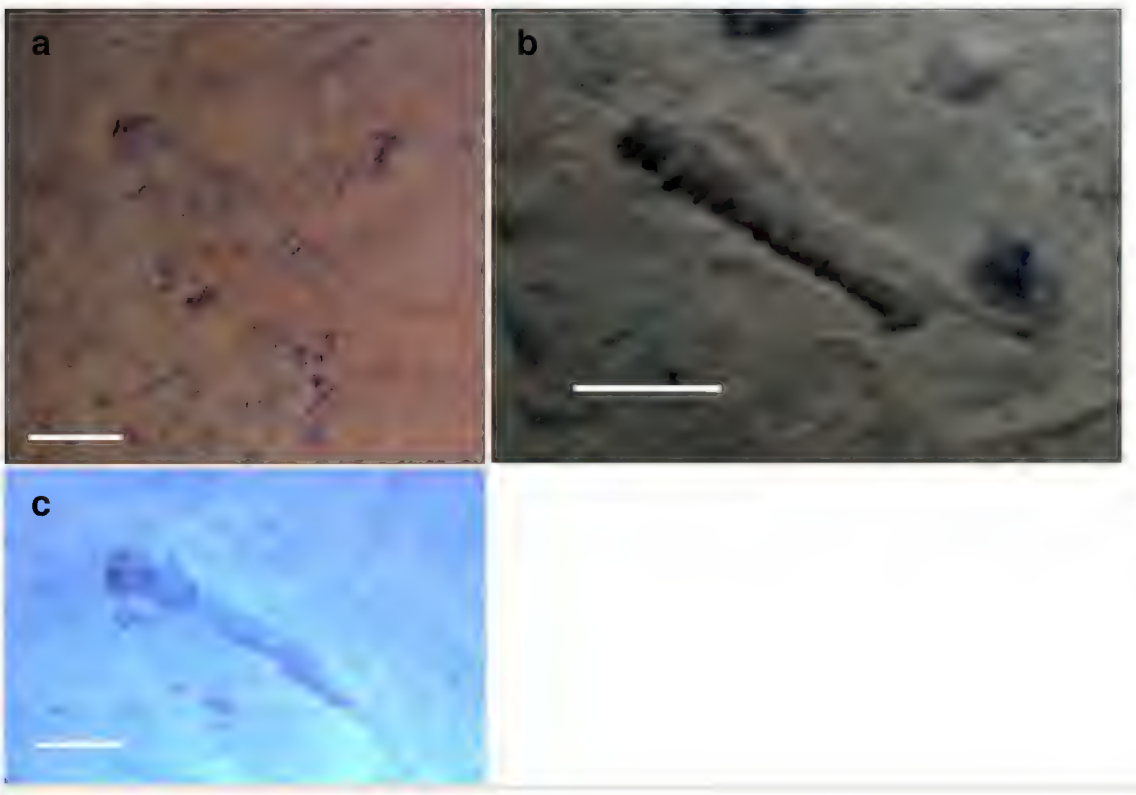

Figure 30.

cf. *Synallactidae* morphospecies 1 observed in the UK-1 exploration contract area and eastern CCZ. Images (a-c) correspond with the data above.

a: cf. *Synallactidae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Synallactidae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

c: cf. *Synallactidae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Materials

a. scientificName: *Synallactidae* sp.; taxonConceptID: cf. *Synallactidae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: family; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3922; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6793; decimalLongitude: -114.4096; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 12:17; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Synallactidae* sp.; taxonConceptID: cf. *Synallactidae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: family; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4219; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.57901; decimalLongitude: -116.6978; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 15:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Synallactidae* sp.; taxonConceptID: cf. *Synallactidae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: family; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4225; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5797; decimalLongitude: -116.7276; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:55; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 30

cf. *Synallactidae* morphospecies 2

Material

a. scientificName: *Synallactidae* sp.; taxonConceptID: cf. *Synallactidae* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: family; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4216; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5894; decimalLongitude: -116.7152; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 9:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 31

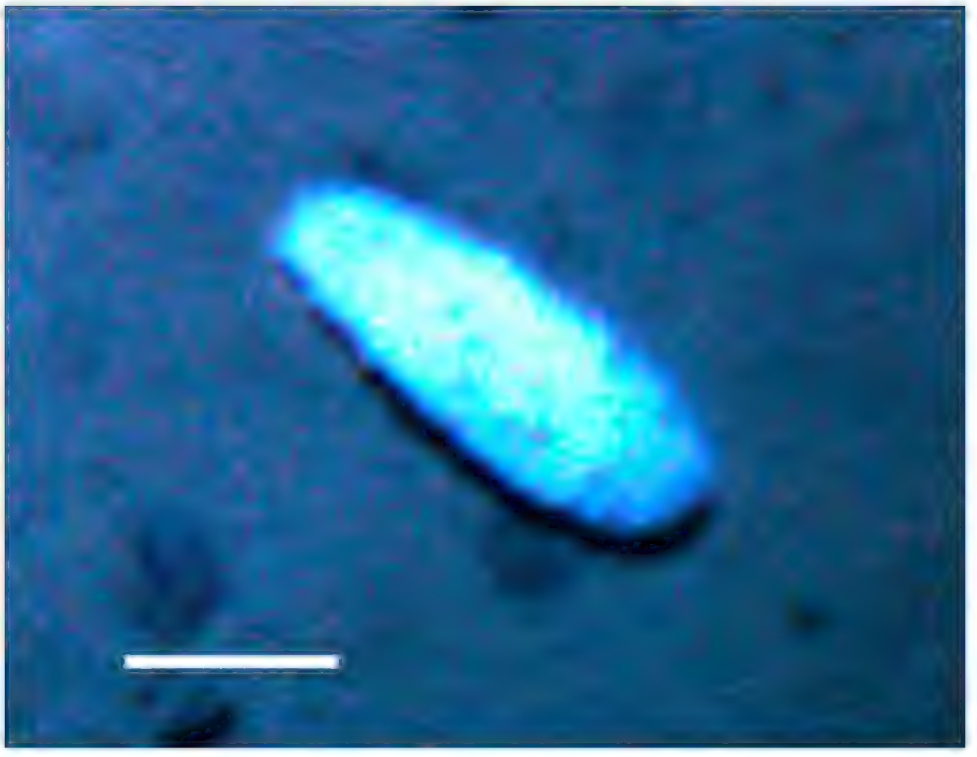

Figure 31.

cf. *Synallactidae* morphospecies 2 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Genus *Molpadiodemas* Heding, 1935

cf. *Molpadiodemas* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Molpadiodemas* morphotype".

Materials

a. scientificName: *Molpadiodemas* sp.; taxonConceptID: cf. *Molpadiodemas* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Molpadiodemas*; scientificNameAuthorship: Heding, 1935; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4053; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9608; decimalLongitude: -116.5548; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 3:43; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Molpadiodemas* sp.; taxonConceptID: cf. *Molpadiodemas* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Molpadiodemas*; scientificNameAuthorship: Heding, 1935; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4055; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9611; decimalLongitude: -116.5541; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 3:52; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language:

en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Molpadiodemas* sp.; taxonConceptID: cf. *Molpadiodemas* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Molpadiodemas*; scientificNameAuthorship: Heding, 1935; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4228; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5801; decimalLongitude: -116.7228; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 11:04; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

d. scientificName: *Molpadiodemas* sp.; taxonConceptID: cf. *Molpadiodemas* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Molpadiodemas*; scientificNameAuthorship: Heding, 1935; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4213; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5708; decimalLongitude: -116.7066; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 15:07; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 32

Genus *Paroriza* Herouard, 1902

cf. *Paroriza* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Paroriza* morphotype".

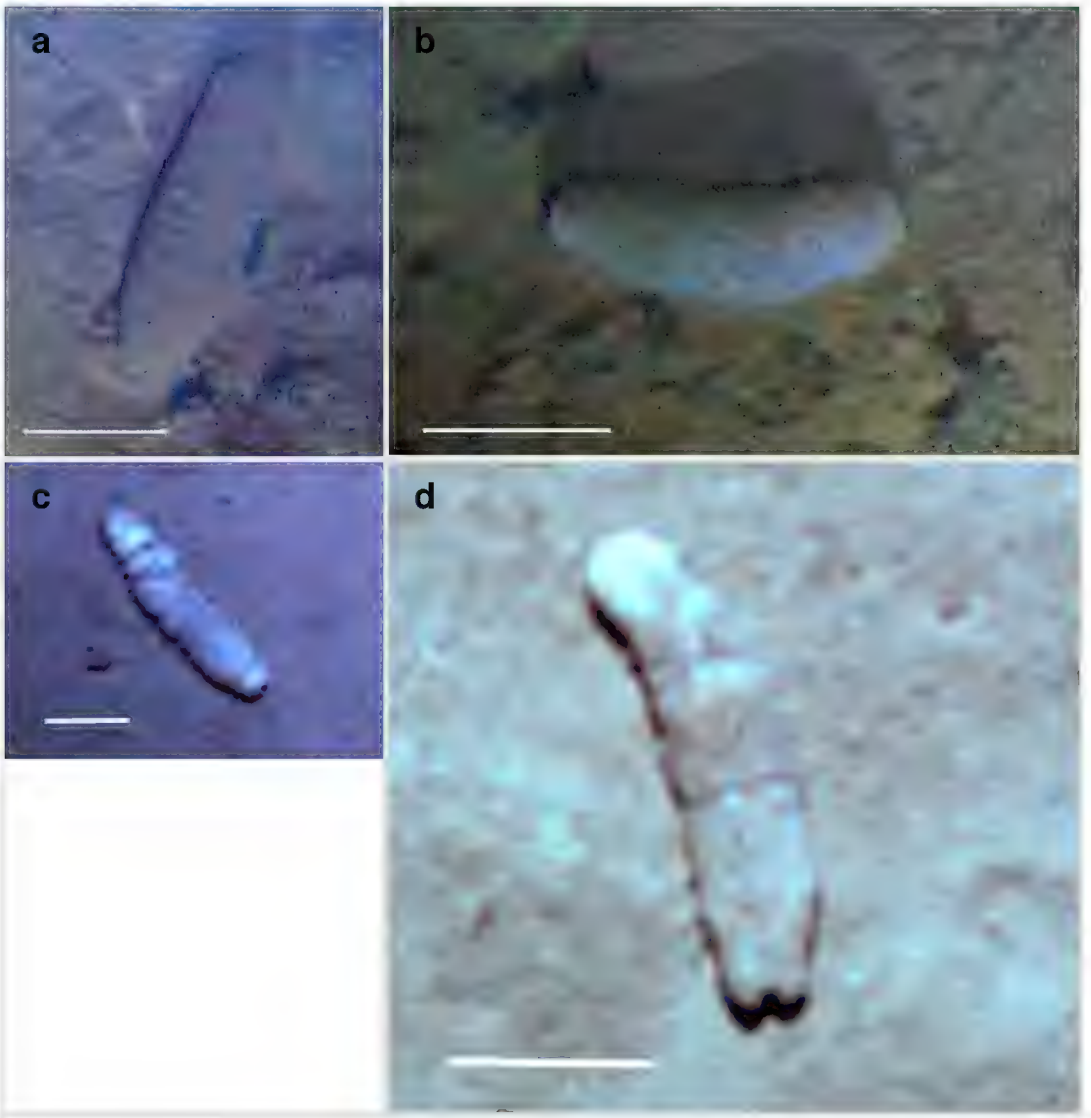

Figure 32.

cf. *Molpadiodemas* morphospecies observed in the UK-1 exploration contract area. Images (a-d) correspond with the data above.

a: cf. *Molpadiodemas* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: cf. *Molpadiodemas* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: cf. *Molpadiodemas* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
d: cf. *Molpadiodemas* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Material

a. scientificName: *Paroriza* sp.; taxonConceptID: cf. *Paroriza* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Paroriza*; scientificNameAuthorship: Herouard, 1902; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4217; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.57799; decimalLongitude: -116.7028; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 15:24; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 2; lifeStage: Adult; preparations: Imaged

only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 33

Figure 33.

Two cf. *Paroriza* morphospecies specimens (likely male and female) in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Genus *Pseudostichopus* Théel, 1886

cf. *Pseudostichopus* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Pseudostichopus* morphotype".

Materials

a. scientificName: *Pseudostichopus* sp.; taxonConceptID: cf. *Pseudostichopus* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Pseudostichopus*; scientificNameAuthorship: Théel, 1886; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1);

verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4032; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8628; decimalLongitude: -116.5485; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Pseudostichopus* sp.; taxonConceptID: cf. *Pseudostichopus* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Pseudostichopus*; scientificNameAuthorship: Théel, 1886; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4028; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8616; decimalLongitude: -116.5483; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:43; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 34

Genus *Synallactes* Ludwig, 1894

cf. *Synallactes* morphospecies 1

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Synallactes* morphotype "white"".

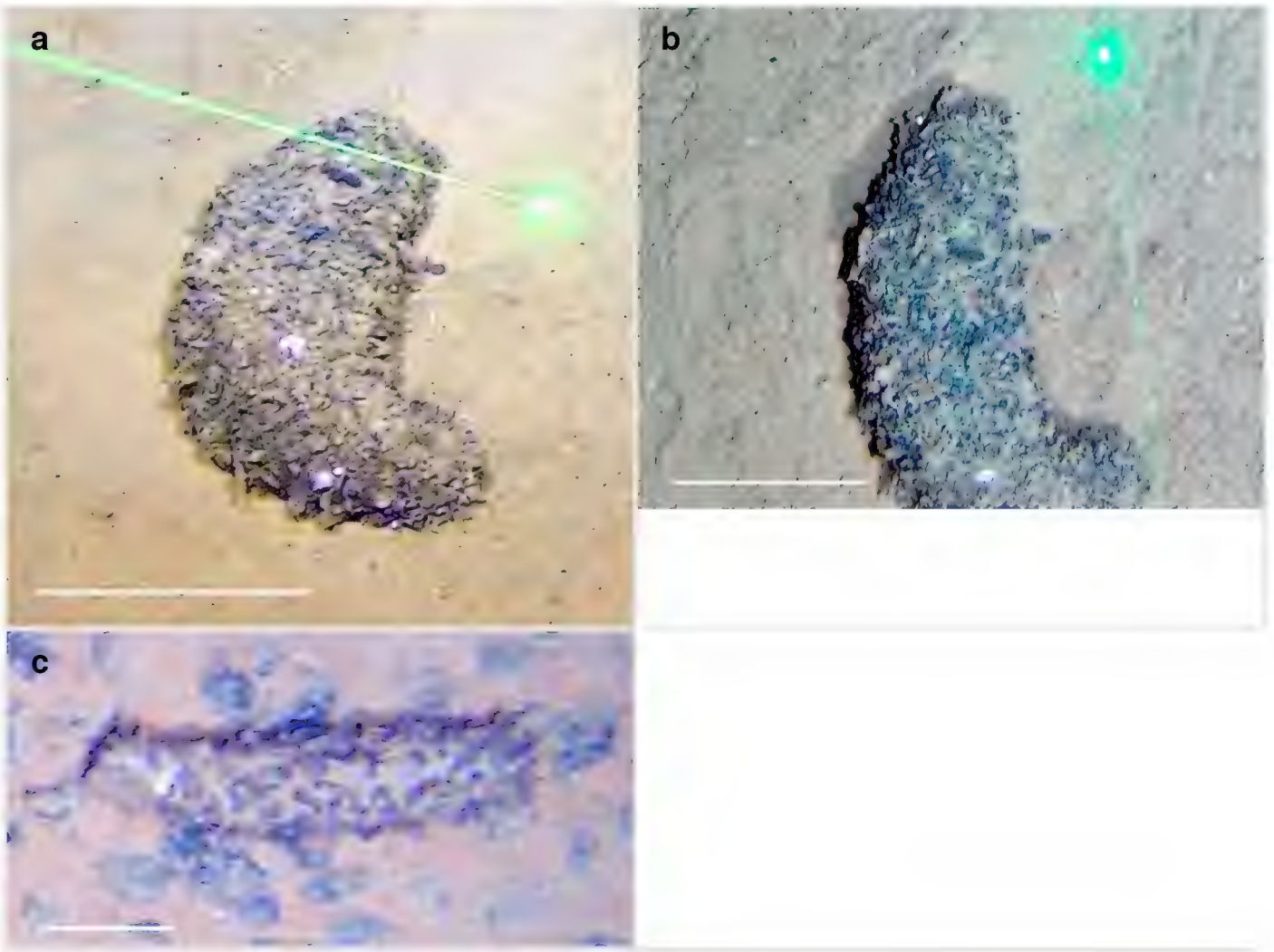

Figure 34.

cf. *Pseudostichopus* morphospecies observed in the UK-1 exploration contract area. Both images (a) and (b) correspond with the data in (a) and image (c) corresponds with the data in (b) above.

a: cf. *Pseudostichopus* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: cf. *Pseudostichopus* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: cf. *Pseudostichopus* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Materials

a. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4021; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8578; decimalLongitude: -116.5481; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 3:48; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance

and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4079; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8615; decimalLongitude: -116.5483; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3949; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4138; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 9:57; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 35

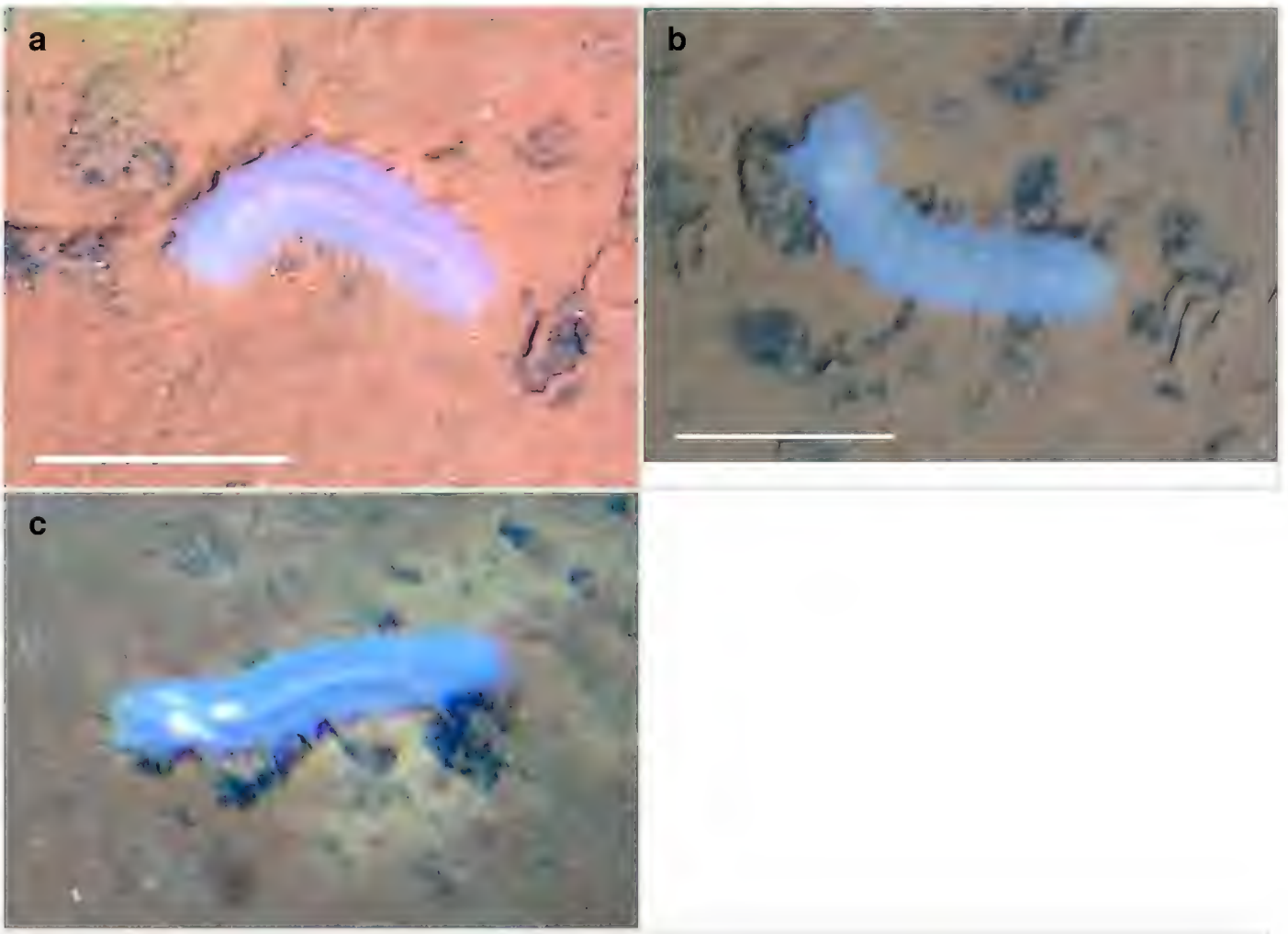

Figure 35.

cf. *Synallactes* morphospecies 1 observed in the UK-1 exploration contract area and eastern CCZ. Images (a-c) correspond with the data above.

a: cf. *Synallactes* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: cf. *Synallactes* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: cf. *Synallactes* morphospecies 1 in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. *Synallactes* morphospecies 2

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Synallactes* morphotype "pink"".

Materials

a. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4254; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4955; decimalLongitude: -116.6505; geodeticDatum:

WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 8:46; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4947; decimalLongitude: -116.6308; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:48; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 36

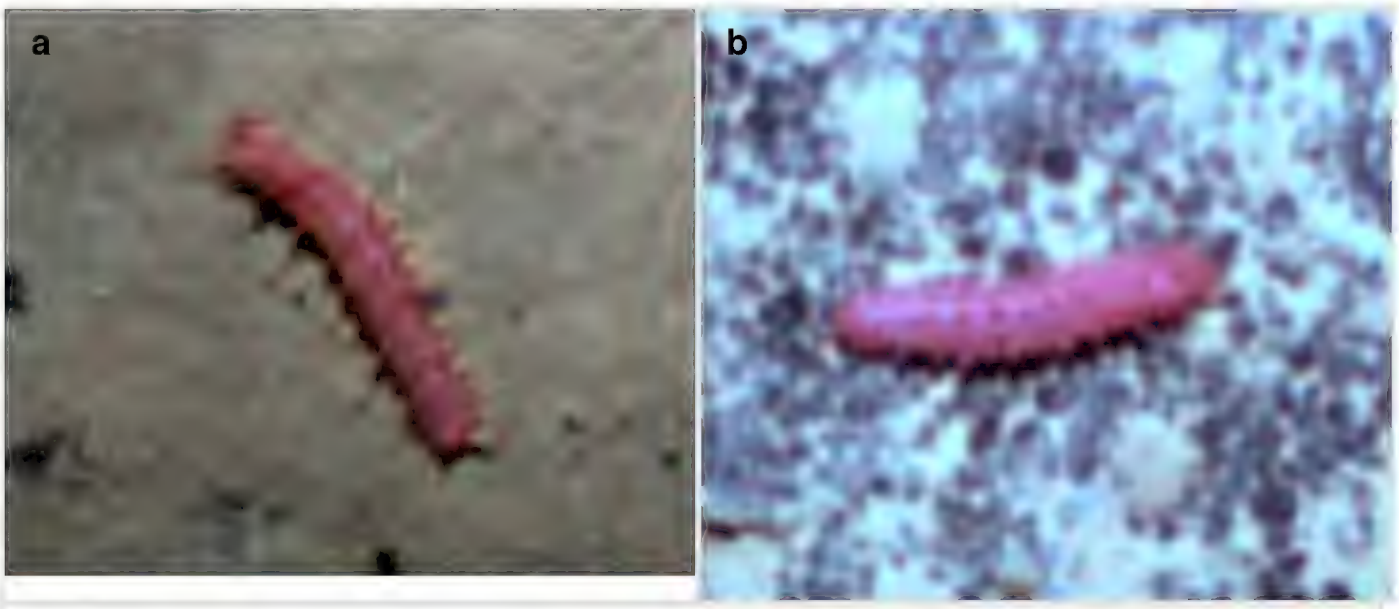

Figure 36.

cf. *Synallactes* morphospecies 2 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: cf. *Synallactes* morphospecies 2 in situ on seafloor. Image attribution: Woods Hole Oceanographic Institution.

b: cf. *Synallactes* morphospecies 2 in situ on seafloor. Image attribution: Woods Hole Oceanographic Institution.

cf. *Synallactes* morphospecies 3

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Synallactidae* morphotype".

Materials

a. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 3; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4249; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4991; decimalLongitude: -116.6409; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 21:52; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Synallactes* sp.; taxonConceptID: cf. *Synallactes* morphospecies 3; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Aspidochirotida; family: Synallactidae; taxonRank: genus; genus: *Synallactes*; scientificNameAuthorship: Ludwig, 1894; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4253; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4936; decimalLongitude: -116.6506; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 23:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 37

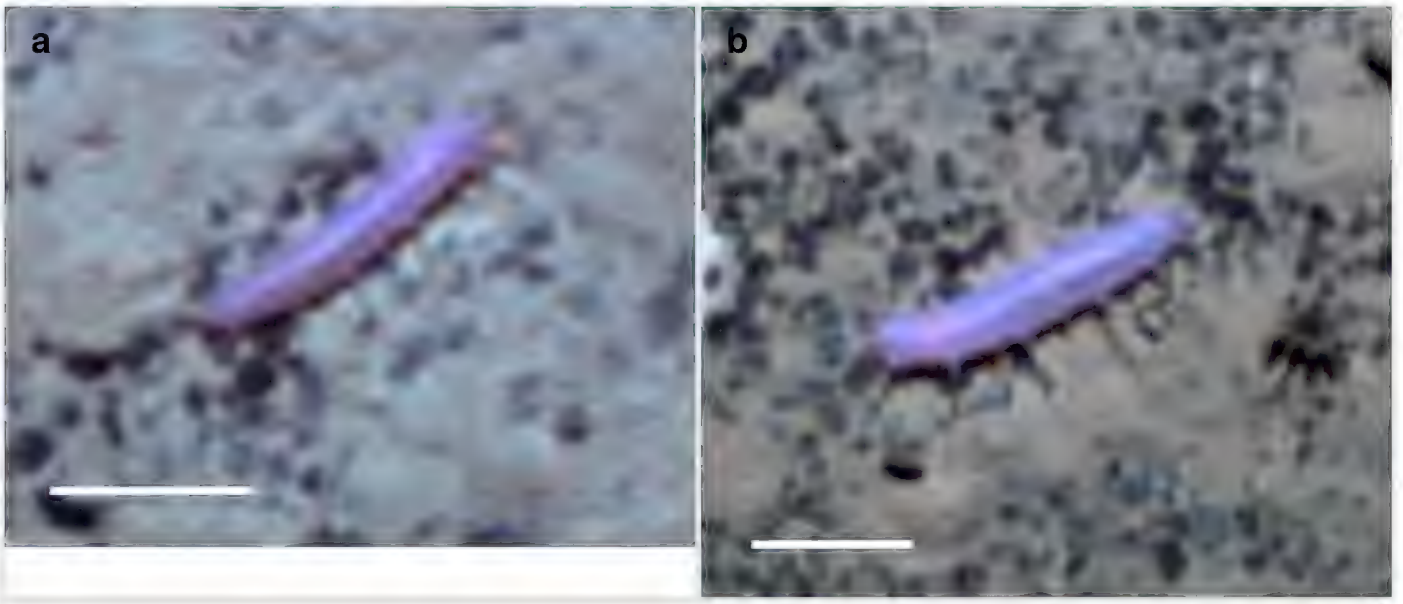

Figure 37.

cf. *Synallactes* morphospecies 3 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: cf. *Synallactes* morphospecies 3 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
b: cf. *Synallactes* morphospecies 3 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Order Elasipodida Théel, 1882

Family Deimatidae Théel, 1882

cf. *Deimatidae* morphospecies 1

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Deimatidae* gen. sp. morphotype".

Materials

a. scientificName: *Deimatidae* sp.; taxonConceptID: cf. *Deimatidae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4162; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3703; decimalLongitude: -116.5194; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 17:39; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only

from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Deimatidae* sp.; taxonConceptID: cf. *Deimatidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4254; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4939; decimalLongitude: -116.6504; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 23:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 38

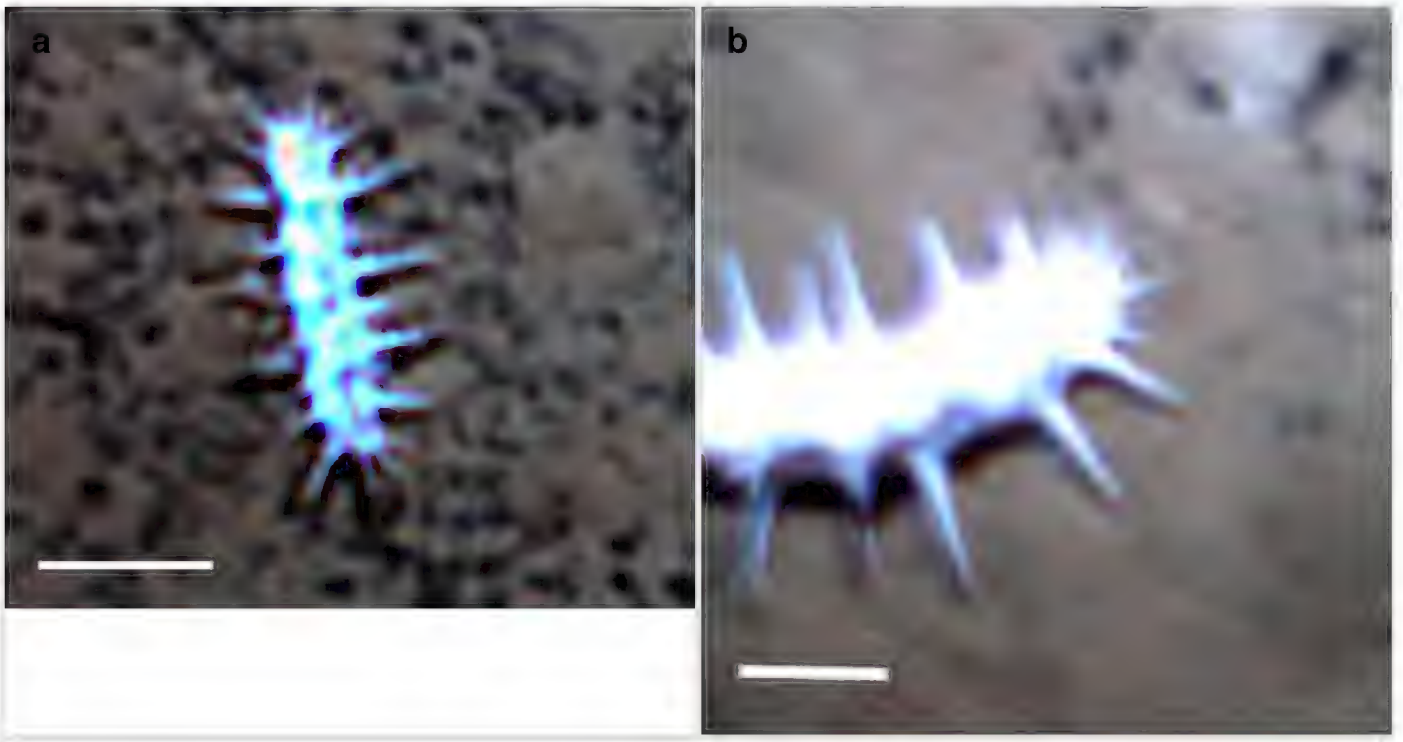

Figure 38.

cf. *Deimatidae* morphospecies 1 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: cf. *Deimatidae* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

b: cf. *Deimatidae* morphospecies 1 in situ on seafloor. Scale bar is 5 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Deimatidae* morphospecies 2

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Orphnurgus* morphotype".

Material

a. scientificName: *Deimatidae* sp.; taxonConceptID: cf. *Deimatidae* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4256; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.49096; decimalLongitude: -116.6511; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 22:23; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 39

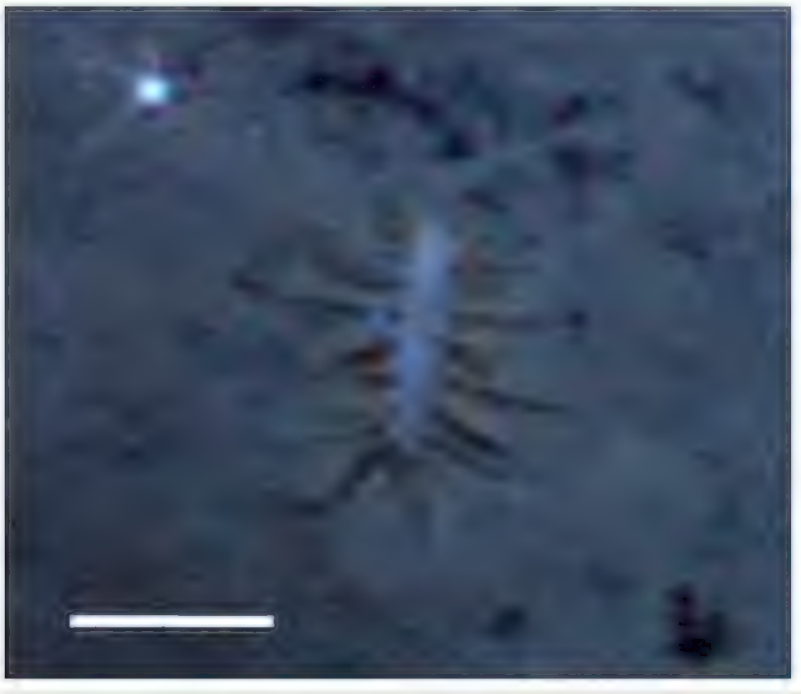

Figure 39.

cf. *Deimatidae* morphospecies 2 observed in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Genus *Deima* Théel, 1879

Deima cf. *validum* Théel, 1879

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "*Deima* morphotype".

Materials

a. scientificName: *Deima validum*; taxonConceptID: *Deima* cf. *validum*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: species; genus: *Deima*; scientificNameAuthorship: Théel, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4254; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4977; decimalLongitude: -116.6525; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 4:01; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Deima validum*; taxonConceptID: *Deima* cf. *validum*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: species; genus: *Deima*; scientificNameAuthorship: Théel, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4226; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5814; decimalLongitude: -116.7244; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 8:42; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 40

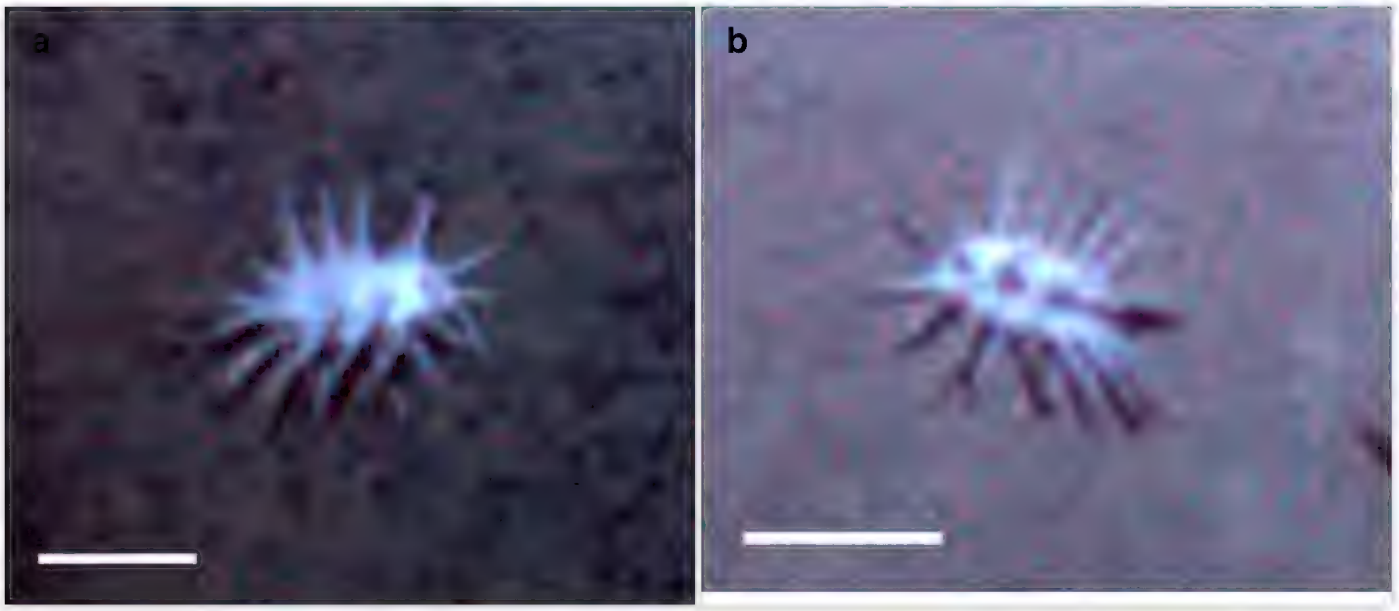

Figure 40.

Deima cf. *validum* observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: *Deima* cf. *validum* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
b: *Deima* cf. *validum* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Genus *Oneirophanta* Théel, 1879

cf. *Oneirophanta* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Oneirophanta setigera* Ludwig, 1893".

Material

a. scientificName: *Oneirophanta* sp.; taxonConceptID: cf. *Oneirophanta* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Deimatidae; taxonRank: genus; genus: *Oneirophanta*; scientificNameAuthorship: Théel, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4033; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8627; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:57; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy:

Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 41

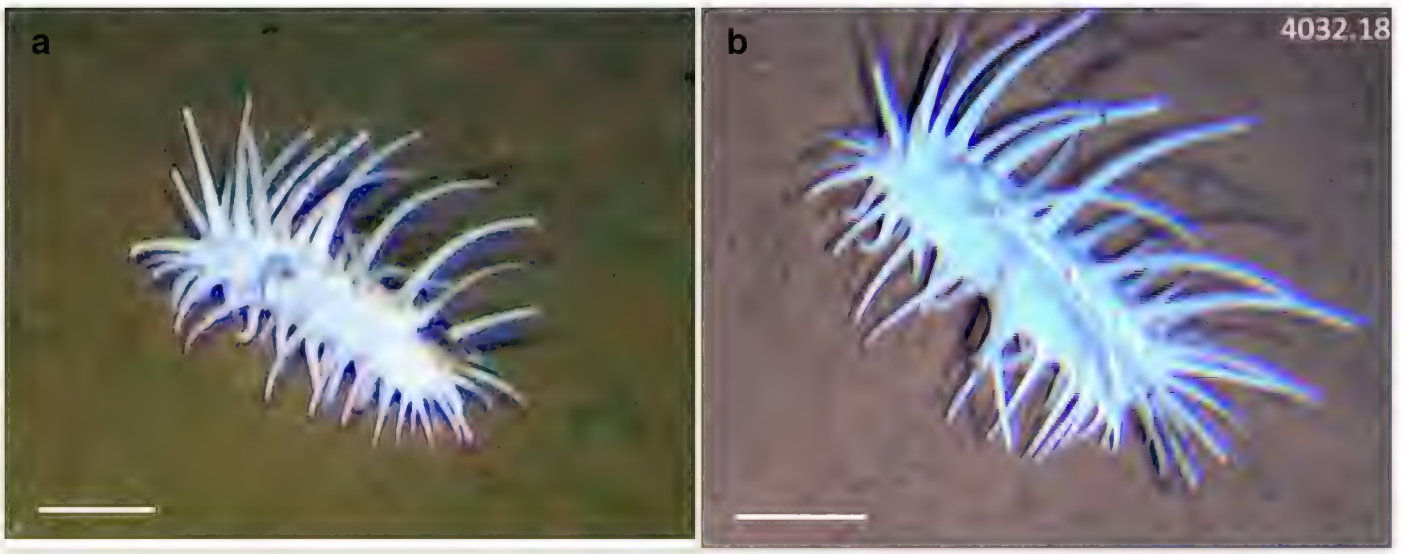

Figure 41.

cf. *Oneirophanta* morphospecies observed in the UK-1 exploration contract area. Both images (a) and (b) correspond with the data in (a) above.

a: cf. *Oneirophanta* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Oneirophanta* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Family Elpidiidae Théel, 1882

cf. *Elpidiidae* morphospecies 1

Material

a. scientificName: *Elpidiidae* sp.; taxonConceptID: cf. *Elpidiidae* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4020; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8554; decimalLongitude: -116.5477; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 3:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Young specimen; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy:

Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 42

Figure 42.

cf. *Elpidiidae* morphospecies 1 observed in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. *Elpidiidae* morphospecies 2

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Elpidiidae* morphotype "double velum"".

Material

a. scientificName: *Elpidiidae* sp.; taxonConceptID: cf. *Elpidiidae* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4254; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4988; decimalLongitude: -116.6496; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 8:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva

J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 43

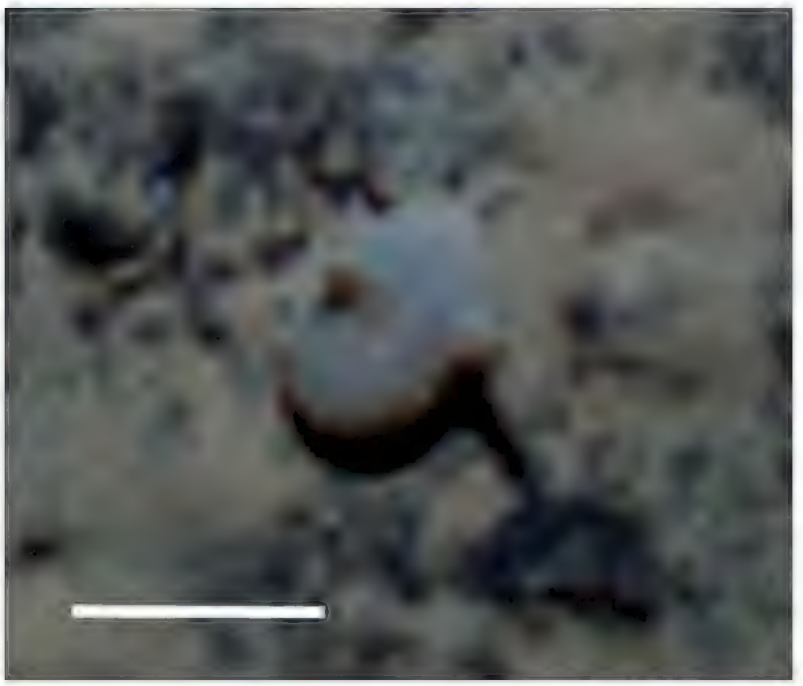

Figure 43.

cf. *Elpidiidae* morphospecies 2 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Genus *Amperima* Pawson, 1965

cf. *Amperima* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Amperima* morphotype".

Material

a. scientificName: *Amperima* sp.; taxonConceptID: cf. *Amperima* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: genus; genus: *Amperima*; scientificNameAuthorship: Pawson, 1965; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3938; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4113; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 12:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present;

associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 44

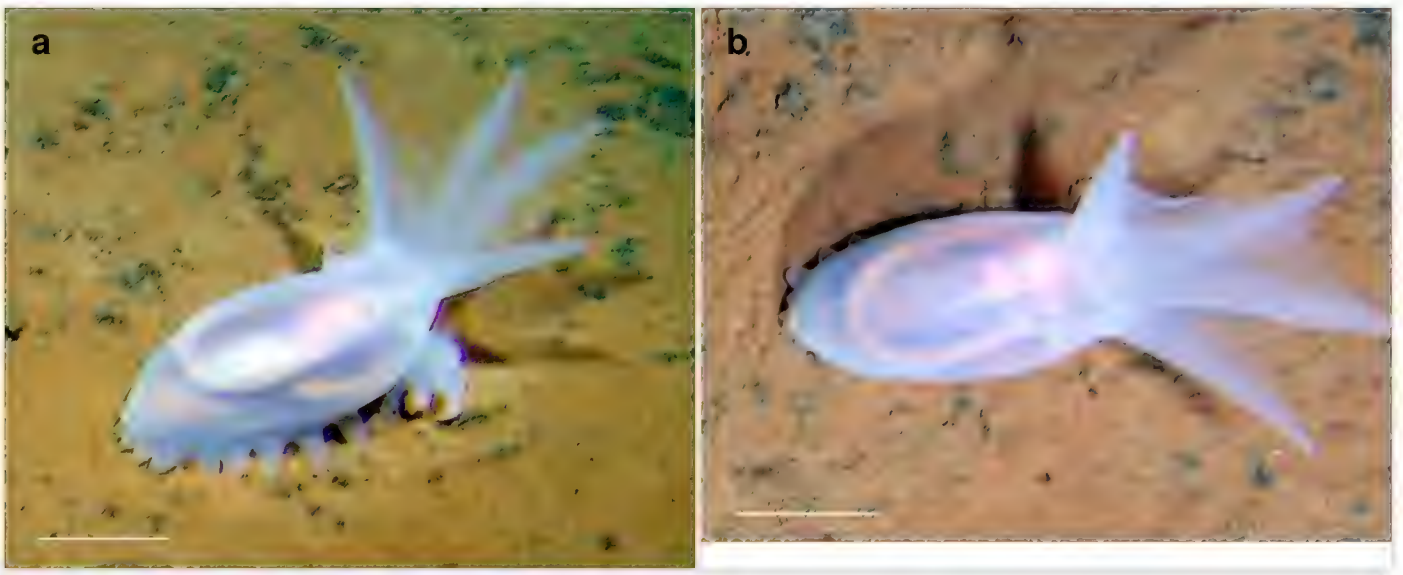

Figure 44.

cf. *Amperima* morphospecies observed in the eastern Clarion-Clipperton Zone. Both images (a) and (b) correspond with the data in (a) above.

a: cf. *Amperima* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Amperima* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Peniagone* Théel, 1882

cf. *Peniagone* morphospecies 1

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Peniagone* morphotype "pink, large velum"".

Material

a. scientificName: *Peniagone* sp.; taxonConceptID: cf. *Peniagone* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: genus; genus: *Peniagone*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1

Stratum B; maximumDepthInMeters: 4211; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5887; decimalLongitude: -116.712; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 12:53; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 45

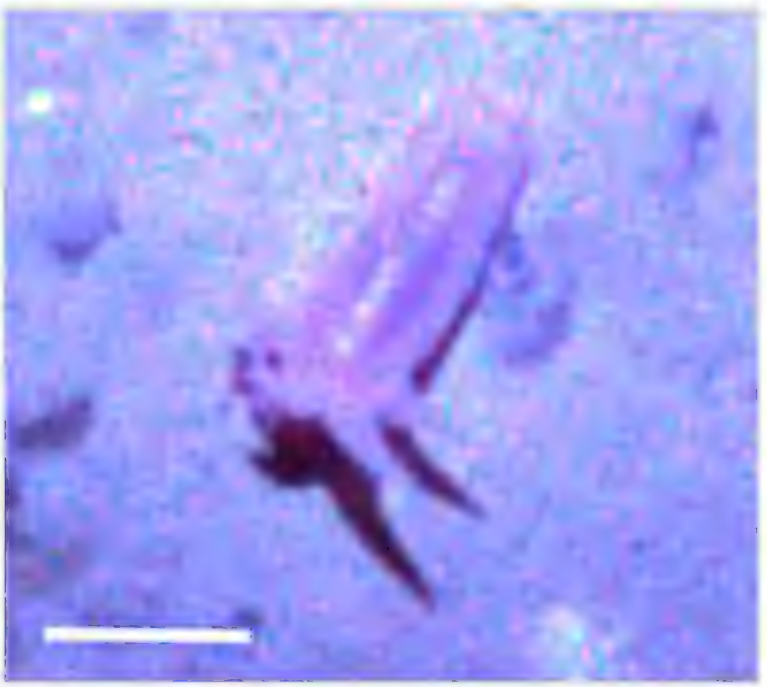

Figure 45.

cf. *Peniagone* morphospecies 1 in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Peniagone* morphospecies 2

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Peniagone* morphotype "tulip"".

Materials

a. scientificName: *Peniagone* sp.; taxonConceptID: cf. *Peniagone* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: genus; genus: *Peniagone*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4150; locationRemarks: RV Thompson Cruise

TN319; decimalLatitude: 12.3712; decimalLongitude: -116.5117; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 13:33; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Peniagone* sp.; taxonConceptID: cf. *Peniagone* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: genus; genus: *Peniagone*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4227; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5844; decimalLongitude: -116.7164; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 12:46; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 46

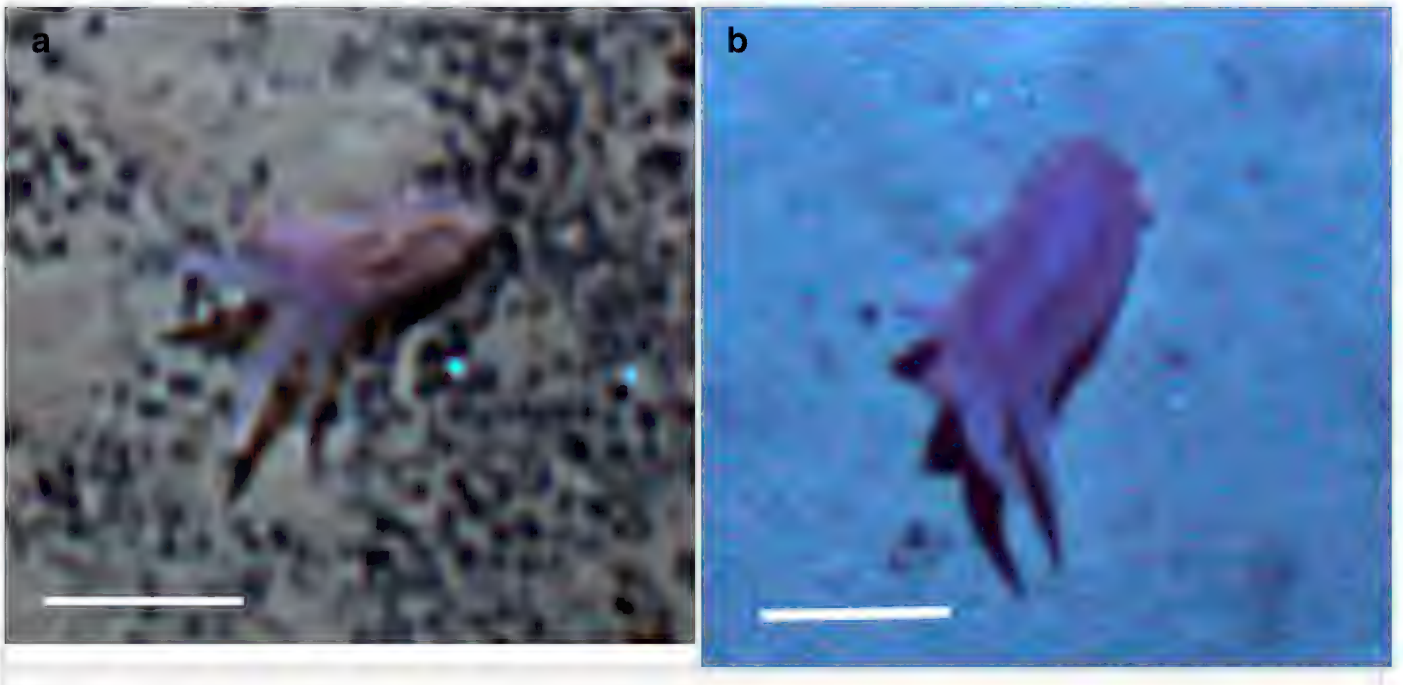

Figure 46.

cf. *Peniagone* morphospecies 2 observed in the UK-1 exploration contract area. Images correspond with the data above.

a: cf. *Peniagone* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

b: cf. *Peniagone* morphospecies 2 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Peniagone cf. *leander* Pawson & Foell, 1986

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Peniagone leander* Pawson & Foell, 1986".

Material

a. scientificName: *Peniagone leander*; taxonConceptID: *Peniagone* cf. *leander*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Elpidiidae; taxonRank: species; genus: *Peniagone*; scientificNameAuthorship: Pawson & Foell, 1986; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4060; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9625; decimalLongitude: -116.5524; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 6:33; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016, 6. doi: 10.1038/srep30492; Pawson DL & Foell EJ. *Peniagone leander* new species, an abyssal benthopelagic sea cucumber (Echinodermata: Holothuroidea) from the eastern Pacific Ocean. Bulletin of Marine Science. 1986, 38(2), 293-299.; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 47

Family Laetmogonidae Ekman, 1926

cf. *Laetmogonidae* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Laetmogonidae* gen. sp.".

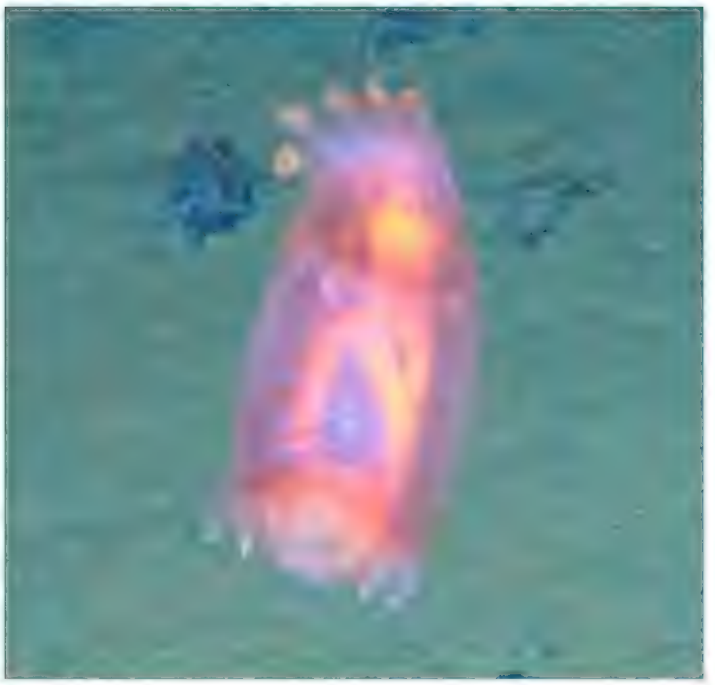

Figure 47.

Peniagone cf. *leander* in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Material

a. scientificName: *Laetmogonidae* sp.; taxonConceptID: cf. *Laetmogonidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Laetmogonidae; taxonRank: family; scientificNameAuthorship: Ekman, 1926; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4107; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8498; decimalLongitude: -116.6456; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:21; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 48

Figure 48.

cf. *Laetmogonidae* morphospecies in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Psychronaetes* Pawson, 1983

Psychronaetes cf. *hanseni* Pawson, 1983

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Psychronaetes hanseni* Pawson, 1983".

Materials

a. scientificName: *Psychronaetes hanseni*; taxonConceptID: *Psychronaetes* cf. *hanseni*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Laetmogonidae; taxonRank: species; genus: *Psychronaetes*; scientificNameAuthorship: Pawson, 1983; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4107; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8502; decimalLongitude: -116.6454; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; *Psychronaetes hanseni*, a new genus

and species of Elasipodan sea cucumber from the eastern central Pacific. Proceedings of the Biological Society of Washington 96 (1): 154-159.; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Psychronaetes hanseni*; taxonConceptID: *Psychronaetes* cf. *hanseni*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Laetmogonidae; taxonRank: species; genus: *Psychronaetes*; scientificNameAuthorship: Pawson, 1983; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4250; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4945; decimalLongitude: -116.6489; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 22:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 49

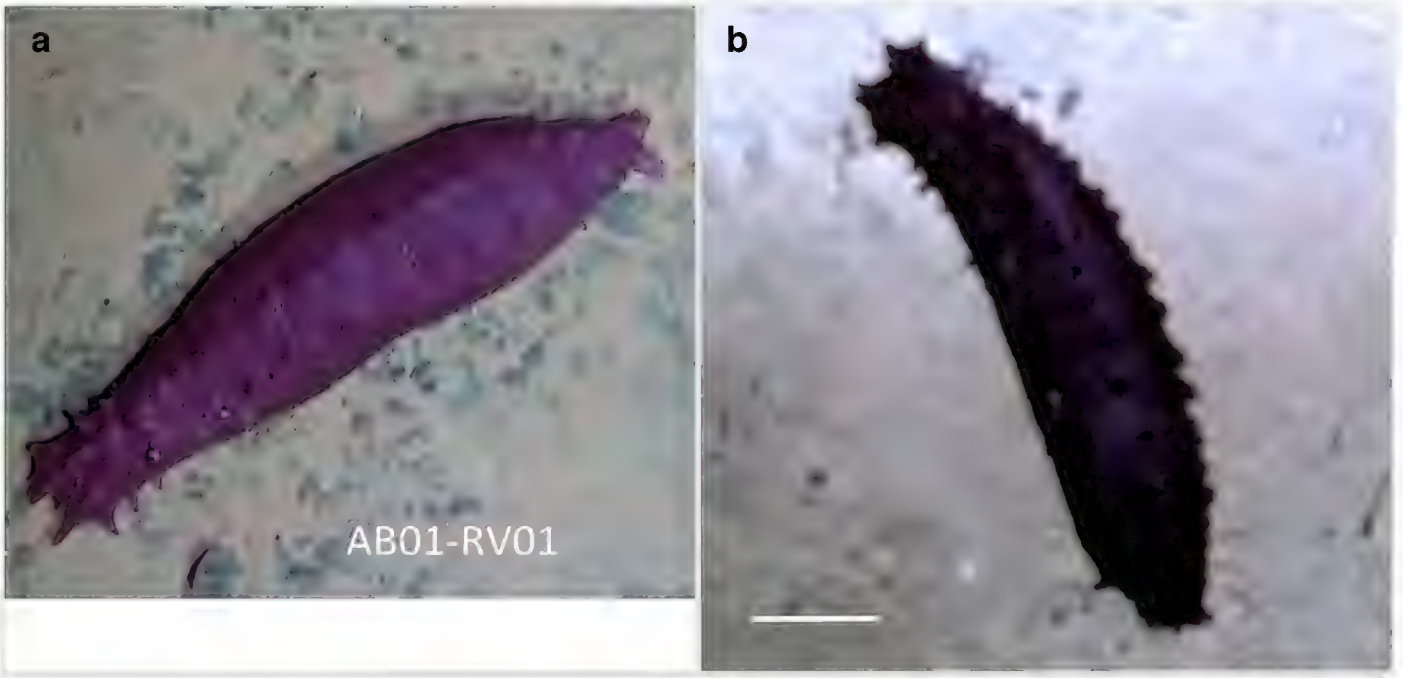

Figure 49.

Psychronaetes cf. *hanseni* observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: *Psychronaetes* cf. *hanseni* in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: *Psychronaetes* cf. *hanseni* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Pelagothuriidae Ludwig, 1893

Genus *Enypniastes* Théel, 1882

cf. *Enypniastes* morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Enypniastes eximia* Théel, 1882".

Material

a. scientificName: *Enypniastes* sp.; taxonConceptID: cf. *Enypniastes* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Pelagothuriidae; taxonRank: genus; genus: *Enypniastes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4200; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5669; decimalLongitude: -116.7084; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-02-21; eventTime: 13:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA02; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; identifiedBy: Jeffrey Drazen, Astrid Leitner, Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 50

Figure 50.

cf. *Enypniastes* morphospecies observed in situ on seafloor the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: A Leitner and J Drazen, University of Hawai'i.

Family Psychropotidae Théel, 1882

cf. *Psychropotidae* morphospecies

Materials

a. scientificName: *Psychropotidae* sp.; taxonConceptID: cf. *Psychropotidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4055; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9673; decimalLongitude: -116.55896; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 0:18; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Young specimen; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Psychropotidae* sp.; taxonConceptID: cf. *Psychropotidae* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: family; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3954; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6797; decimalLongitude: -114.4145; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 13:27; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Young specimen; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 51

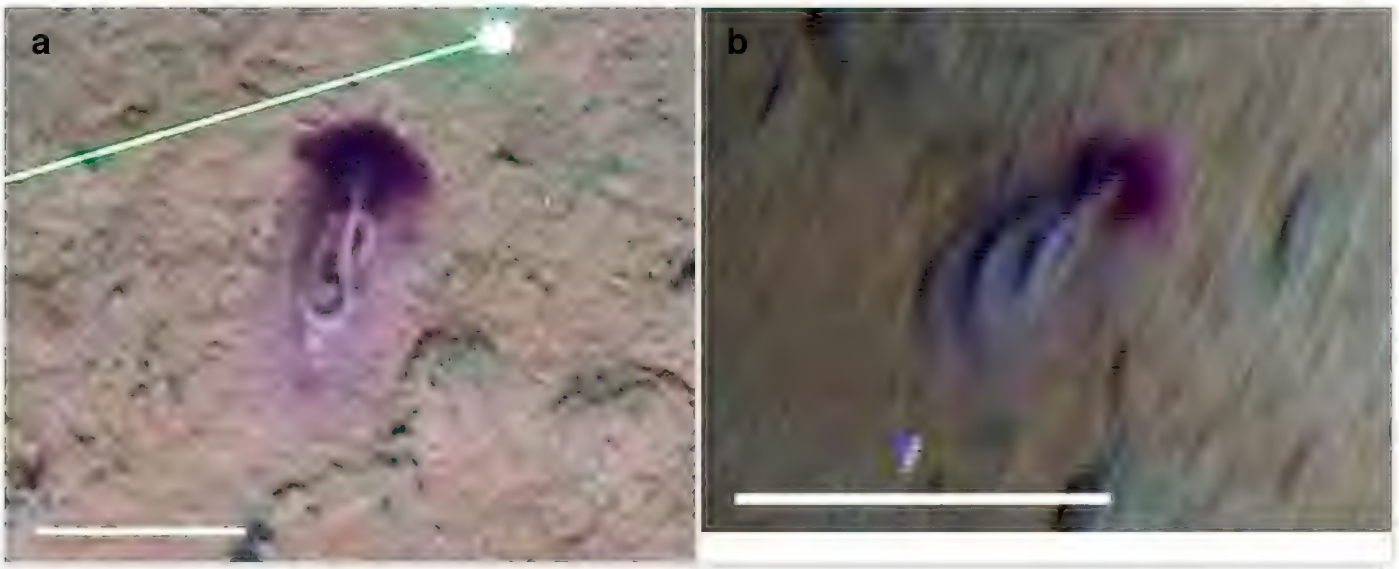

Figure 51.

cf. *Psychropotidae* morphospecies (young specimen) observed in the UK-1 exploration contract area and eastern CCZ. Images correspond with the data above.

a: cf. *Psychropotidae* morphospecies (young specimen) in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: cf. *Psychropotidae* morphospecies (young specimen) in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Genus *Benthodytes* Théel, 1882

cf. *Benthodytes* morphospecies 1

Materials

a. scientificName: *Benthodytes* sp.; taxonConceptID: cf. *Benthodytes* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: genus; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4164; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3688; decimalLongitude: -116.5207; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 15:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Benthodytes* sp.; taxonConceptID: cf. *Benthodytes* morphospecies 1; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: genus; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4255; locationRemarks: RV

Thompson Cruise TN319; decimalLatitude: 12.5062; decimalLongitude: -116.6493; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 20:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 52

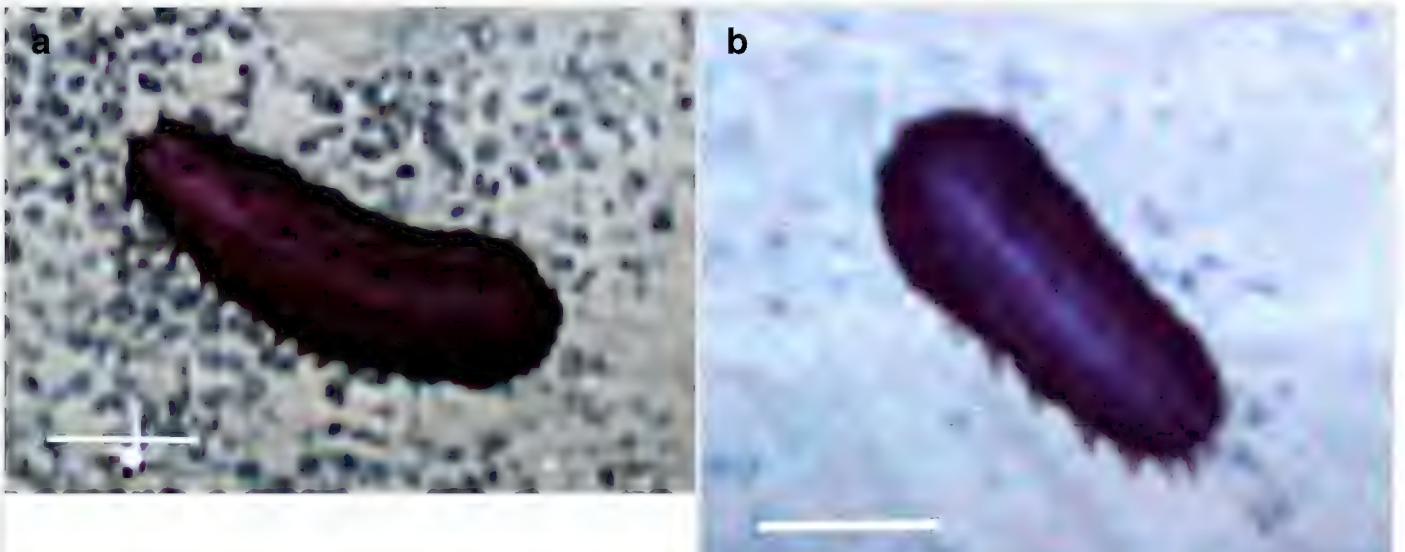

Figure 52.

cf. *Benthodytes* morphospecies 1 observed in the UK-1 exploration contract area. Images correspond with the data above.

a: cf. *Benthodytes* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
b: cf. *Benthodytes* morphospecies 1 in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

cf. *Benthodytes* morphospecies 2

Material

a. scientificName: *Benthodytes* sp.; taxonConceptID: cf. *Benthodytes* morphospecies 2; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: genus; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4024; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8585; decimalLongitude: -116.5472; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 2:28; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Young specimen; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F

Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 53

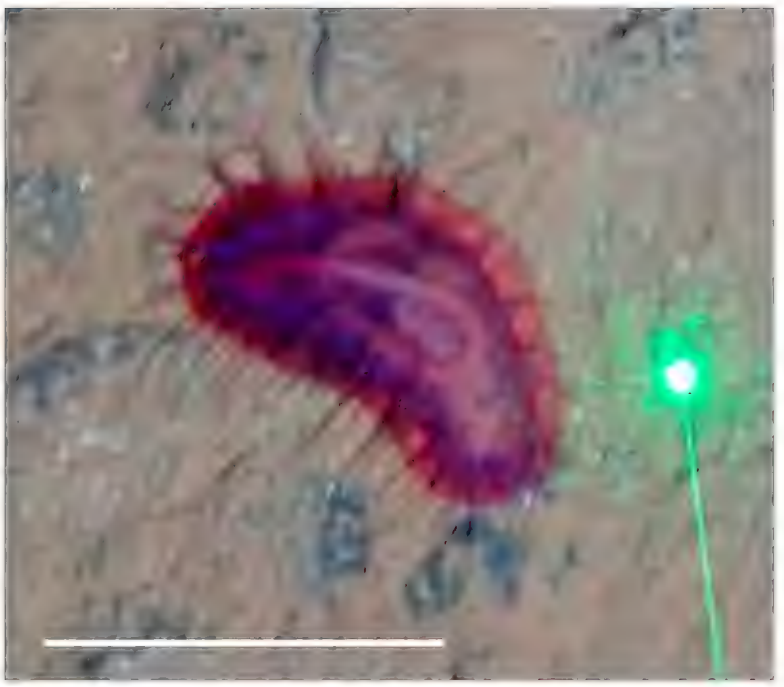

Figure 53.

cf. *Benthodytes* morphospecies 2 (young specimen) in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Benthodytes cf. *incerta* Ludwig, 1893

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "*Benthodytes* cf. *incerta*".

Materials

a. scientificName: *Benthodytes incerta*; taxonConceptID: *Benthodytes* cf. *incerta*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Ludwig, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3909; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6785; decimalLongitude: -114.4064; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime:

11:18; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On rock; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Benthodytes incerta*; taxonConceptID: *Benthodytes* cf. *incerta*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Ludwig, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4032; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8628; decimalLongitude: -116.5485; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Benthodytes incerta*; taxonConceptID: *Benthodytes* cf. *incerta*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Ludwig, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4030; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8624; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:54; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 54

Figure 54.

Benthodytes cf. *incerta* observed in the UK-1 exploration contract area and eastern CCZ. Images correspond with the data above.

a: *Benthodytes* cf. *incerta* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: *Benthodytes* cf. *incerta* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: *Benthodytes* cf. *incerta* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Benthodytes cf. *typica* Théel, 1882

Materials

a. scientificName: *Benthodytes typica*; taxonConceptID: *Benthodytes* cf. *typica*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4063; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.96301; decimalLongitude: -116.5513; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-15; eventTime: 22:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG,

Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Benthodytes typica*; taxonConceptID: *Benthodytes* cf. *typica*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4060; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9621; decimalLongitude: -116.5523; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 4:17; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Benthodytes typica*; taxonConceptID: *Benthodytes* cf. *typica*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Benthodytes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4063; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9629; decimalLongitude: -116.5513; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 6:14; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-RV03-CS-04; recordNumber: AB01-RV03-CS-04; NHM216; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: d0062182-89dc-4deb-b746-688289783b5f; 5023498; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016 (4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519546 | KU519513; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren;

dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 55

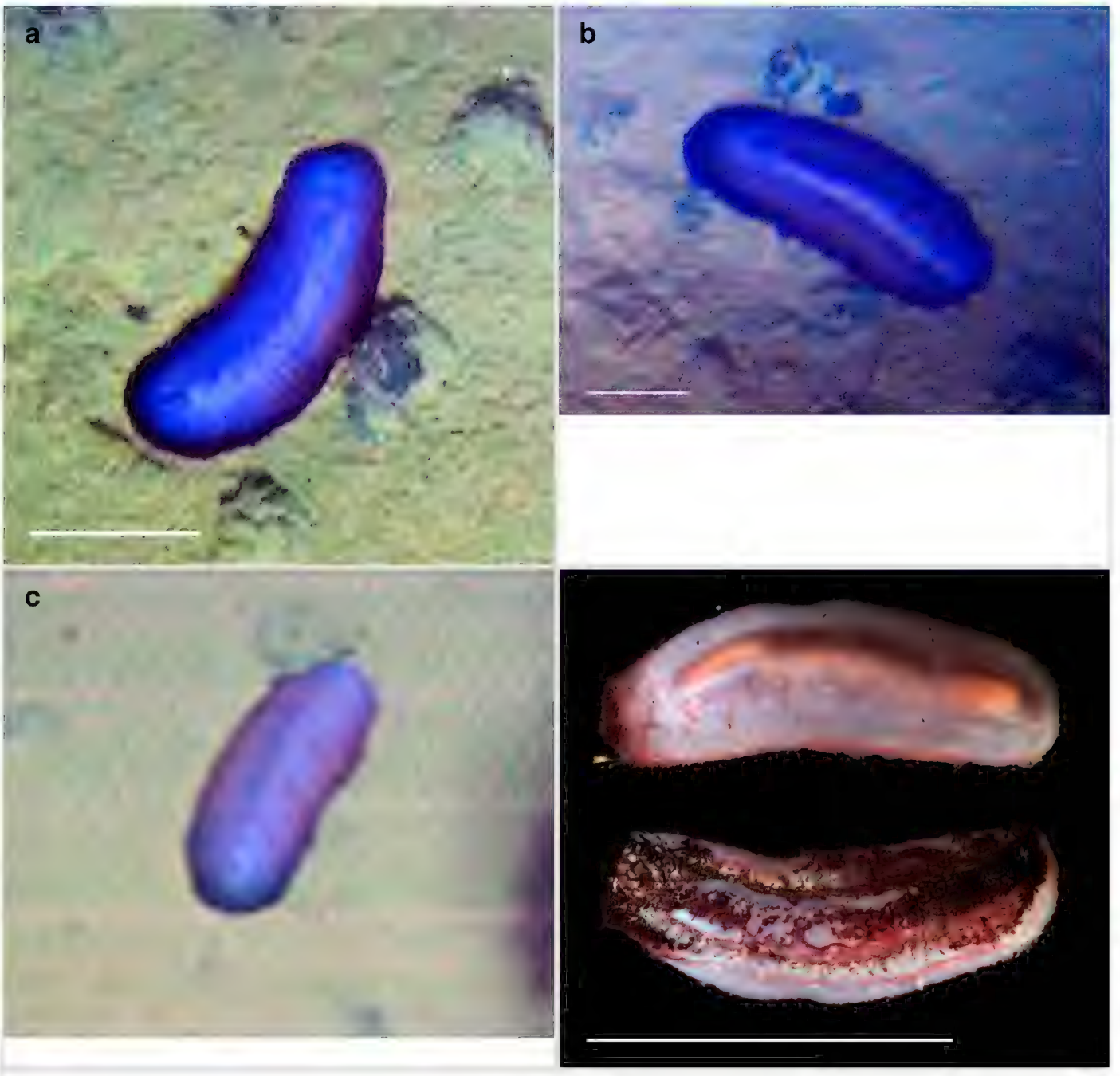

Figure 55.

Benthodytes cf. *typica* observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above, while images (c-d) correspond with the data in (c) above.

a: *Benthodytes* cf. *typica* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: *Benthodytes* cf. *typica* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

c: *Benthodytes* cf. *typica* in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

d: *Benthodytes* cf. *typica* after collection. Scale bar is 10 cm. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.

Genus *Psychropotes* Théel, 1882

Psychropotes cf. *semperiana* Théel, 1882

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as "*Psychropotes* cf. *semperiana*".

Materials

a. scientificName: *Psychropotes semperiana*; taxonConceptID: *Psychropotes semperiana*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Psychropotes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4062; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9628; decimalLongitude: -116.5509; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 4:38; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-RV03-CS05; recordNumber: AB01-RV03-CS05; NHM220; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: 38c16bec-7bf9-4c2b-b862-5da460ba6c0c; 5023502; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519526; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

b. scientificName: *Psychropotes semperiana*; taxonConceptID: *Psychropotes* cf. *semperiana* ; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Psychropotes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4170; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.37503; decimalLongitude: -116.5249; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-19; eventTime: 0:31; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina

Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Psychropotes semperiana*; taxonConceptID: *Psychropotes* cf. *semperiana* ; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Psychropotes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4184; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5687; decimalLongitude: -116.7383; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

d. scientificName: *Psychropotes semperiana*; taxonConceptID: *Psychropotes* cf. *semperiana* ; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Psychropotes*; scientificNameAuthorship: Théel, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4212; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5735; decimalLongitude: -116.7334; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:45; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 56

Psychropotes cf. *verrucosa* Ludwig, 1893

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Psychropotes verrucosa* Ludwig, 1893".

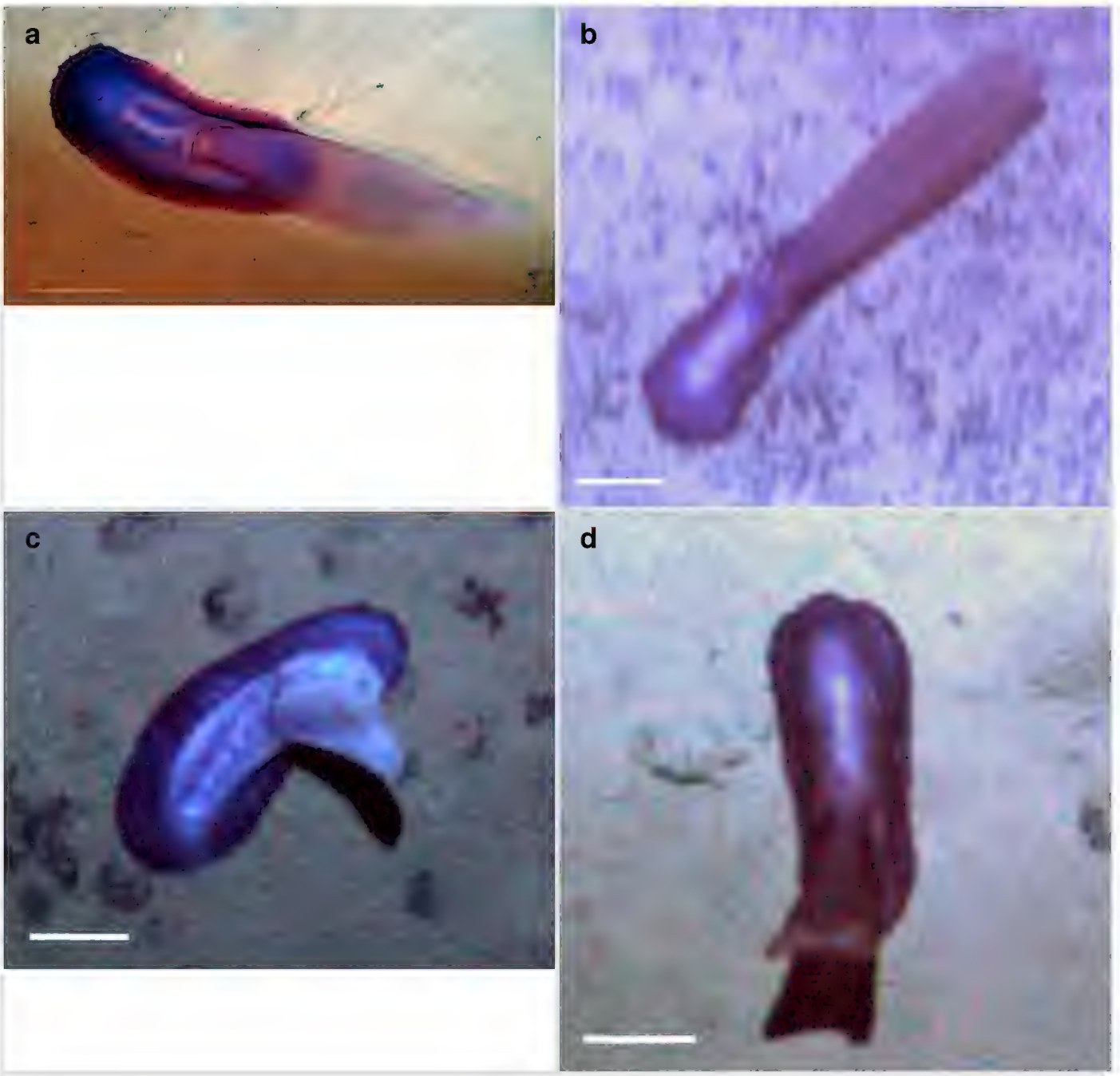

Figure 56.

Psychropotes cf. *semperiana* observed in the UK-1 exploration contract area. Images (a-d) correspond with the data above.

a: *Psychropotes semperiana* in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: *Psychropotes* cf. *semperiana* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
c: *Psychropotes* cf. *semperiana* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
d: *Psychropotes* cf. *semperiana* in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Material

a. scientificName: *Psychropotes verrucosa*; taxonConceptID: *Psychropotes* cf. *verrucosa*; kingdom: Animalia; phylum: Echinodermata; class: Holothuroidea; order: Elasipodida; family: Psychropotidae; taxonRank: species; genus: *Psychropotes*; scientificNameAuthorship: Ludwig, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area

(UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4023; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8569; decimalLongitude: -116.5474; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 2:49; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Antonina Kremenetskaia, David L Pawson, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 57

Figure 57.

Psychropotes cf. *verrucosa* in situ on seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Class Ophiuroidea Gray, 1840

cf. *Ophiuroidea* morphospecies

Materials

a. scientificName: *Ophiuroidea* sp.; taxonConceptID: cf. *Ophiuroidea* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; taxonRank: class; scientificNameAuthorship: Gray, 1840; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5789; decimalLongitude: -116.6918; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 5:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On rock; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Ophiuroidea* sp.; taxonConceptID: cf. *Ophiuroidea* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; taxonRank: class; scientificNameAuthorship: Gray, 1840; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4255; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5021; decimalLongitude: -116.64896; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 8:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Ophiuroidea* sp.; taxonConceptID: cf. *Ophiuroidea* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; taxonRank: class; scientificNameAuthorship: Gray, 1840; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4248; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5046; decimalLongitude: -116.6393; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:25; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 58

Figure 58.

cf. *Ophiuroidea* morphospecies observed in the UK-1 exploration contract area. Images (a-c) correspond with the data above.

a: cf. *Ophiuroidea* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.
b: cf. *Ophiuroidea* morphospecies (left) and an unidentified ophiuroid (right) in situ on seafloor. Image attribution: Woods Hole Oceanographic Institution.
c: cf. *Ophiuroidea* morphospecies in situ on seafloor. Image attribution: Woods Hole Oceanographic Institution.

Order Ophiurida Müller & Troschel, 1840

Family Amphiuridae Ljungman, 1867

Genus *Amphioplus* Verrill, 1899

Amphioplus (*Unioplus*) *daleus* Lyman, 1879

Materials

a. scientificName: *Amphioplus* (*Unioplus*) *daleus*; taxonConceptID: *Amphioplus* (*Unioplus*) *daleus*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Amphiuridae; taxonRank: species; genus: *Amphioplus*; scientificNameAuthorship: Lyman, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4053; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8634; decimalLongitude: -116.5467; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Megacorer; eventDate: 2013-10-21; eventTime: 8:48; habitat: Abyssal polymetallic-nodule field; fieldNumber: Megacorer 10 (MC10); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-MC10-CS-15; recordNumber: AB01-MC10-CS-15; NHM447; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: 15e6ddc7-3ca7-453c-bba5-f84888716505; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519545 | KU519511 | KU519529; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

b. scientificName: *Amphioplus* (*Unioplus*) *daleus*; taxonConceptID: *Amphioplus* (*Unioplus*) *daleus*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Amphiuridae; taxonRank: species; genus: *Amphioplus*; scientificNameAuthorship: Lyman, 1879; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4237; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5212; decimalLongitude: -116.6982; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Box corer; eventDate: 2015-03-08; eventTime: 8:04; habitat: Abyssal polymetallic-nodule field; fieldNumber: Box corer 19 (BC19); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: Found underneath a nodule; catalogNumber: AB02-BC19-CS-30; recordNumber: AB02-BC19-CS-30; NHM1591; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2015; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 59

Figure 59.

Amphioplus (*Unioplus*) *daleus* observed in the UK-1 exploration contract area. Images (a-b) correspond with the data above.

a: *Amphioplus* (*Unioplus*) *daleus* after collection. Scale bar is 1 cm. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.
b: *Amphioplus* (*Unioplus*) *daleus* after collection. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.

Family Ophiacanthidae Ljungman, 1867

Genus *Ophiacantha* Müller & Troschel, 1842

cf. *Ophiacantha* morphospecies

Materials

a. scientificName: *Ophiacantha* sp.; taxonConceptID: cf. *Ophiacantha* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiacanthidae; taxonRank: genus; genus: *Ophiacantha*; scientificNameAuthorship: Muller & Troschel, 1842; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 3935; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8604; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:27; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from

imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Ophiacantha* sp.; taxonConceptID: cf. *Ophiacantha* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiacanthidae; taxonRank: genus; genus: *Ophiacantha*; scientificNameAuthorship: Muller & Troschel, 1842; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4028; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8631; decimalLongitude: -116.5486; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:02; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Frequently observed on sponge stalks, rocks and seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 60

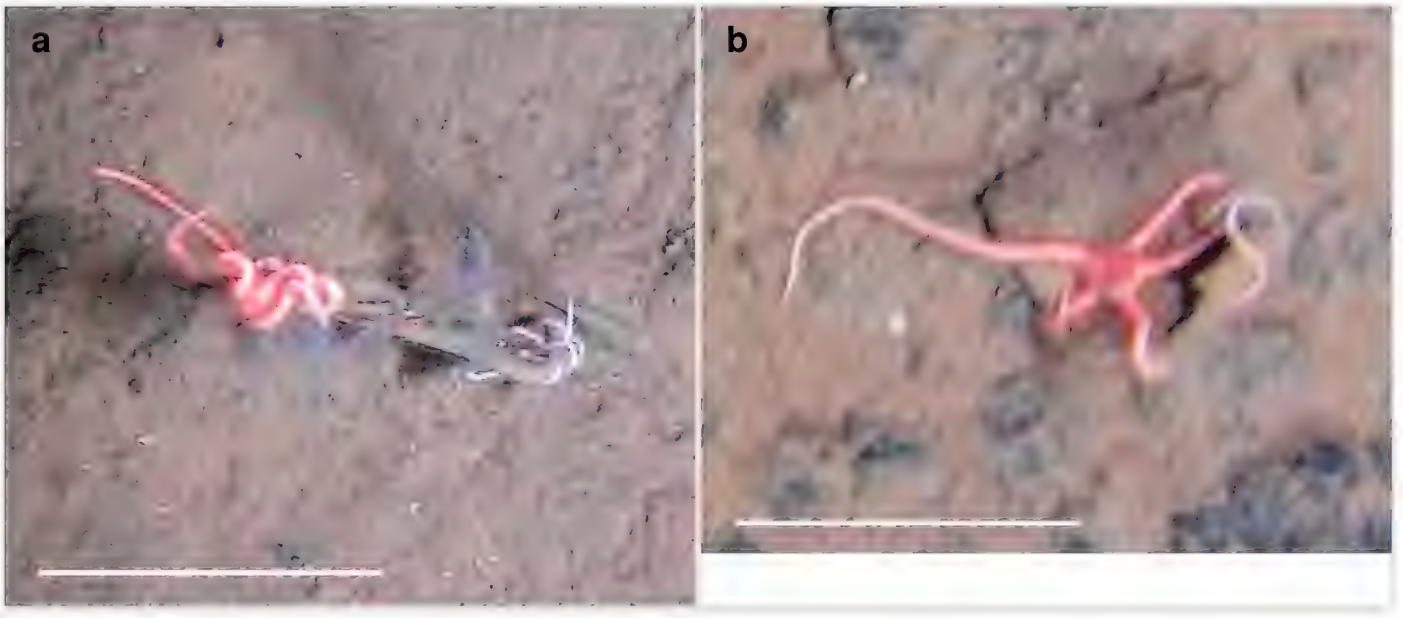

Figure 60.

cf. *Ophiacantha* morphospecies observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. *Ophiacantha* morphospecies in situ attached to a dead sponge stalk. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

b: cf. *Ophiacantha* morphospecies in situ on seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Family Ophiolepididae Ljungman, 1867

Genus *Ophiosphalma* H.L. Clark, 1941

Ophiosphalma cf. *glabrum* Lütken & Mortensen, 1899

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (http://ccfzatlas.com/), this morphospecies is listed as " *Ophiosphalma* morphotype".

Materials

a. scientificName: *Ophiosphalma glabrum*; taxonConceptID: *Ophiosphalma* cf. *glabrum*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiolepididae; taxonRank: species; genus: *Ophiosphalma*; scientificNameAuthorship: Lutken & Mortensen, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4075; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7609; decimalLongitude: -116.4653; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-17; eventTime: 19:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-RV05-CS-06; recordNumber: AB01-RV05-CS-06; NHM329; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: 11948cb9-654f-4519-a654-f134380093ea; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519555 | KU519519 | KU519536; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

b. scientificName: *Ophiosphalma glabrum*; taxonConceptID: *Ophiosphalma* cf. *glabrum*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiolepididae; taxonRank: species; genus: *Ophiosphalma*; scientificNameAuthorship: Lutken & Mortensen, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4075; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7609; decimalLongitude: -116.4653; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-17; eventTime: 19:06; habitat: Abyssal

polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB01-RV05-CS-08; recordNumber: AB01-RV05-CS-08; NHM338; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; otherCatalogNumbers: 292bd655-83d6-440f-9668-82dfa4185b04; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; associatedSequences: http://www.ncbi.nlm.nih.gov/nuccore/KU519556; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler, Adrian Glover, Helena Wiklund, Thomas Dahlgren; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

c. scientificName: *Ophiosphalma glabrum*; taxonConceptID: *Ophiosphalma* cf. *glabrum*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiolepididae; taxonRank: species; genus: *Ophiosphalma*; scientificNameAuthorship: Lutken & Mortensen, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4123; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8498; decimalLongitude: -116.6457; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:34; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: 10.1038/srep30492 | Glover AG, Wiklund H, Rabone M, Amon DJ, Smith CR, O'Hara T, Mah CL, Dahlgren TG. Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata. Biodiversity data journal. 2016(4). doi: 10.3897/BDJ.4.e7251; identifiedBy: Tim O'Hara, Diva J, Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 61

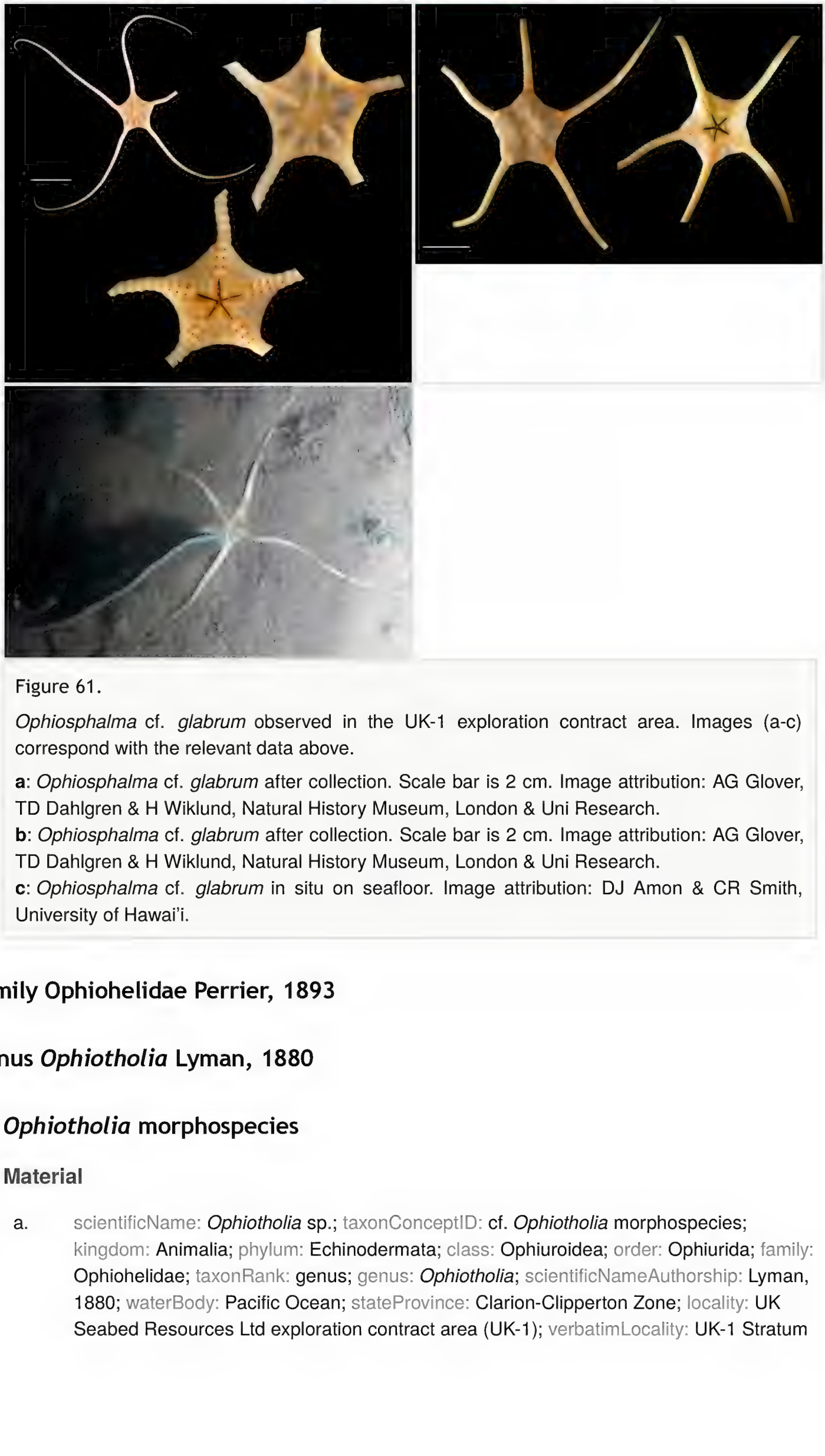

Figure 61.

Ophiosphalma cf. *glabrum* observed in the UK-1 exploration contract area. Images (a-c) correspond with the relevant data above.

a: *Ophiosphalma* cf. *glabrum* after collection. Scale bar is 2 cm. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.
b: *Ophiosphalma* cf. *glabrum* after collection. Scale bar is 2 cm. Image attribution: AG Glover, TD Dahlgren & H Wiklund, Natural History Museum, London & Uni Research.
c: *Ophiosphalma* cf. *glabrum* in situ on seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Family Ophiohelidae Perrier, 1893

Genus *Ophiotholia* Lyman, 1880

cf. *Ophiotholia* morphospecies

Material

a. scientificName: *Ophiotholia* sp.; taxonConceptID: cf. *Ophiotholia* morphospecies; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiohelidae; taxonRank: genus; genus: *Ophiotholia*; scientificNameAuthorship: Lyman, 1880; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum

B; maximumDepthInMeters: 4158; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.367; decimalLongitude: -116.51695; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Box corer; eventDate: 2015-02-17; eventTime: 12:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Box corer 02 (BC02); individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB02-BC02-CS-02; recordNumber: AB02-BC02-CS-02; NHM524; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified by morphology; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Notes: Fig. 62

Figure 62.

Ophiotholia morphospecies after collection from the UKSRL exploration contract area. Scale bar is 1 cm. Image attribution: C Harding, Museums Victoria.

Family Ophiuridae Müller & Troschel, 1840

Genus *Ophiotypa* Koehler, 1897

Ophiotypa cf. *simplex* Koehler, 1897

Materials

a. scientificName: *Ophiotypa simplex*; taxonConceptID: *Ophiotypa* cf. *simplex*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiuridae; taxonRank: species; genus: *Ophiotypa*; scientificNameAuthorship: Koehler,

1897; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4066; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7602; decimalLongitude: -116.4678; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

b. scientificName: *Ophiotypa simplex*; taxonConceptID: *Ophiotypa* cf. *simplex*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiuridae; taxonRank: species; genus: *Ophiotypa*; scientificNameAuthorship: Koehler, 1897; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3952; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4143; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 9:49; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J Amon, Amanda F Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

c. scientificName: *Ophiotypa simplex*; taxonConceptID: *Ophiotypa simplex*; kingdom: Animalia; phylum: Echinodermata; class: Ophiuroidea; order: Ophiurida; family: Ophiuridae; taxonRank: species; genus: *Ophiotypa*; scientificNameAuthorship: Koehler, 1897; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.58255; decimalLongitude: -116.6509667; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Megacorer; eventDate: 2015-03-18; eventTime: 3:2; habitat: Abyssal polymetallic-nodule field; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denaturedethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; behavior: On seafloor; catalogNumber: AB02-MC25-CS76; recordNumber: AB02-MC25-CS76; NHM2083; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Tim O'Hara, Diva J Amon, Amanda F Ziegler; dateIdentified: 2015; identificationRemarks: Identified by morphology; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fig. 63

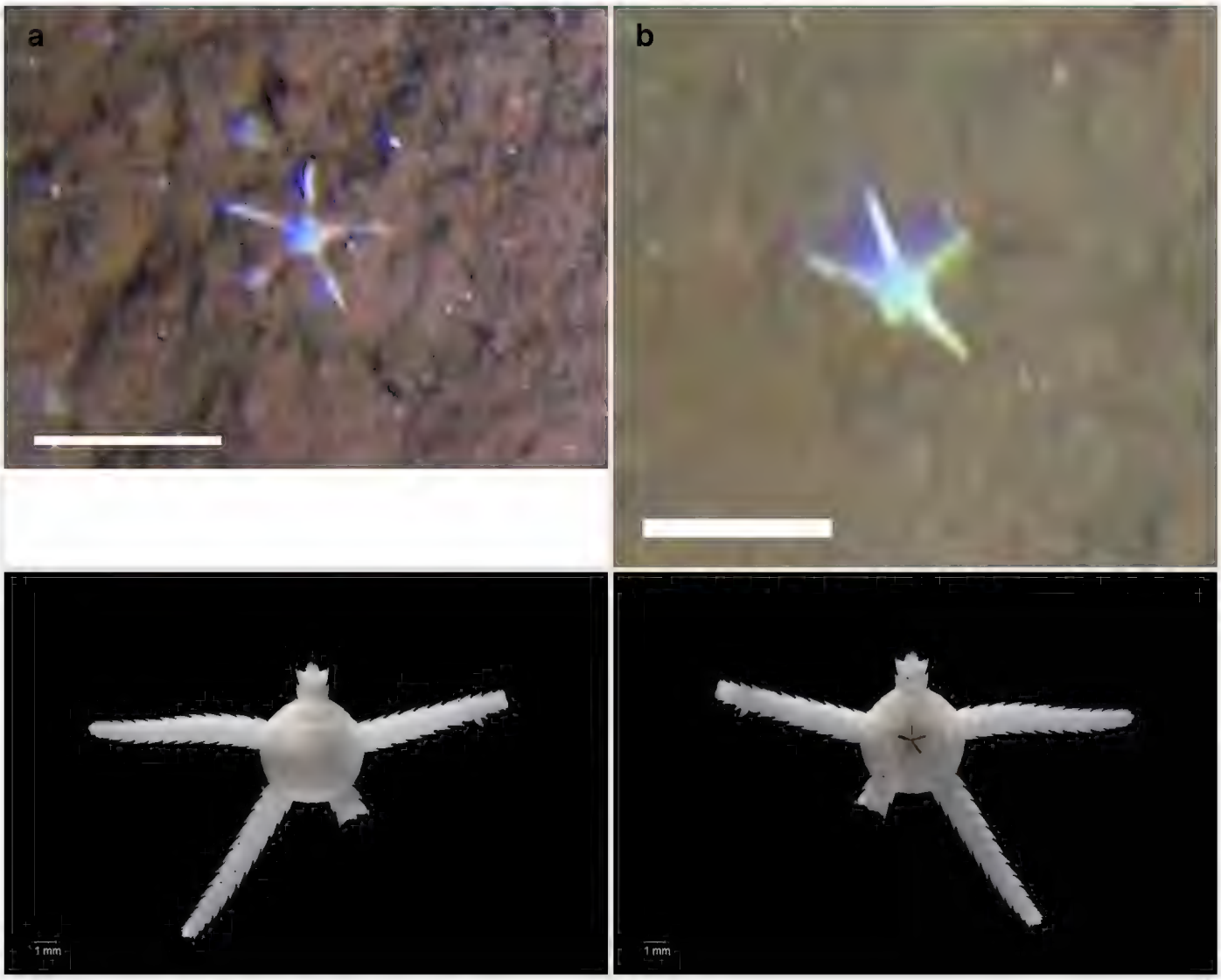

Figure 63.

Ophiotypa cf. *simplex* observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data in (a-b) and images (c-d) correspond with the data in (c) above.

a: *Ophiotypa* cf. *simplex* in situ on seafloor. Scale bar is 2 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
b: *Ophiotypa* cf. *simplex* in situ on seafloor. Scale bar is 2 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.
c: Aboral view of *Ophiotypa simplex* after collection. Scale bar is 1 mm. Image attribution: C Harding, Museums Victoria.
d: Oral view of *Ophiotypa simplex* after collection. Scale bar is 1 mm. Image attribution: C Harding, Museums Victoria.

Discussion

Although many of the morphospecies included here remain taxonomically ambiguous, we provide the first image atlas of echinoderm megafauna morphospecies inhabiting the UK-1 exploration contract area and the eastern CCZ. There were 62 distinct morphospecies (13 Asteroidea, 5 Crinoidea, 9 *Echinoidea*, 29 Holothuroidea and 6 *Ophiuroidea*) observed, making it the most speciose phylum in the wider ABYSSLINE study. This is the highest species richness for one phyla ever recorded in the entire CCZ region and is even more remarkable given that this is from one exploration contract area (UK-1) and a single dive

site east of the contract area. Previous studies in the CCZ have identified 38 echinoderm morphotypes (Foell and Pawson 1986), and 46 morphotypes (Tilot 2006). Bluhm and Gebruk (1999) noted 28 holothurian morphotypes from the DISCOL site in the southeastern Pacific Ocean, which is similar to the numbers observed during this study (29). The quantitative study by (Amon et al. 2016b) which utilised many of the images from AB01 included in this study reported 41 echinoderm morphotypes (the second-most speciose phylum behind Cnidaria - 48 morphotypes) from UK-1 Stratum A and EPIRB only. However, we recognise that the comparison of echinoderm species richness aross the region is only valid if sampling effort was similar or standardised (Amon et al. 2016b). This suggests that the Echinodermata are the most conspicuous, and therefore, best-characterised of all phyla occuring the CCZ.

These morphospecies represent a range of functional traits: the crinoids are sessile or semi-sessile suspension feeders, reliant on the polymetallic nodules as hard substrate, whereas most of the asteroids (excluding brisingids), echinoids, holothurians, and ophiuroids are mobile deposit feeders (Amon et al. 2016b, Vanreusel et al. 2016). Approximately half of the morphospecies in this atlas have been observed in other contract areas in the CCZ (http://ccfzatlas.com/, Bluhm and Gebruk 1999, Pawson 1983, Pawson and Foell 1986, Tilot 2006), although this may be an overestimate given the presence of cryptic species and the problems identifying megafauna from imagery, as has been experienced during studies in other poorly-explored areas (Amon et al. 2016b, Vrijenhoek 2009, Bickford et al. 2006, Linse et al. 2007). Information like this will likely be crucial to inform the future environmental management of the region.

While this image atlas has expanded the knowledge of benthic fauna in the UK-1 exploration claim area and overall CCZ, there is still a need for further high-quality imagery of fauna, and an even more dire need for physical megafaunal specimens to ground-truth the morphospecies observed in images via detailed morphological and molecular analyses. We expect that a number of the morphospecies included in this atlas may be new to science, new records, or poorly known, but this can only be confirmed when specimens are collected and analysed. Molecular analyses are especially important given the presence of cryptic species. The limited collection of voucher specimens in the CCZ thus far has severely hampered reliable estimation of species richness and species distributions and continues to be an issue. Although the taxonomic identification of preserved material is always necessary, we hope that this atlas will aid scientists by showing what these morphospecies look like in situ in their natural surroundings, as well as by providing some ecological information (e.g. feeding modes, preferred habitat etc.). This information will be important in estimating the human impact on this ecosystem. Furthermore, the appearance of morphospecies captured in situ in images can drastically differ from that of collected or preserved material, especially when relatively rudimentary collection equipment (trawls, dredges etc.) are used. As mentioned in Amon et al. (2016b), there is also a need for those working in the CCZ to make available detailed descriptions of equipment and methods to facilitate data standardization and statistically-rigorous regional comparisons. It is also important that the ISA-sponsored online atlas continues to be updated with new imagery

(such as the images in this atlas), and that the morphospecies are properly identified with the help of taxonomists.

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Author contributions

CRS designed the ABYSSLINE megafaunal studies and served as chief scientist on the AB01 and AB02 cruises. DJA and CRS directed ROV and AUV operations and megafaunal sampling. DJA and AFZ were responsible for megafaunal processing at sea. DJA and AFZ processed and edited imagery and processed specimens on shore. CM identified the asteroids. TO identified the ophiuroids. RM identified the echinoids. DLP and AK identified the holothurians. MR identified the crinoids. DJA wrote the main manuscript text and prepared the figures. DJA, CRS, AFZ, CM, TO, RM, MR, DLP and AK reviewed and edited the manuscript.

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